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RADIOLOGIC REFLECTIONS

Shadow or substance

Marcus J. Smith, M.D., Santa Fe, New Mexico
Guest Contributor: Dr. Omar Legant, Albuquerque, New Mexico

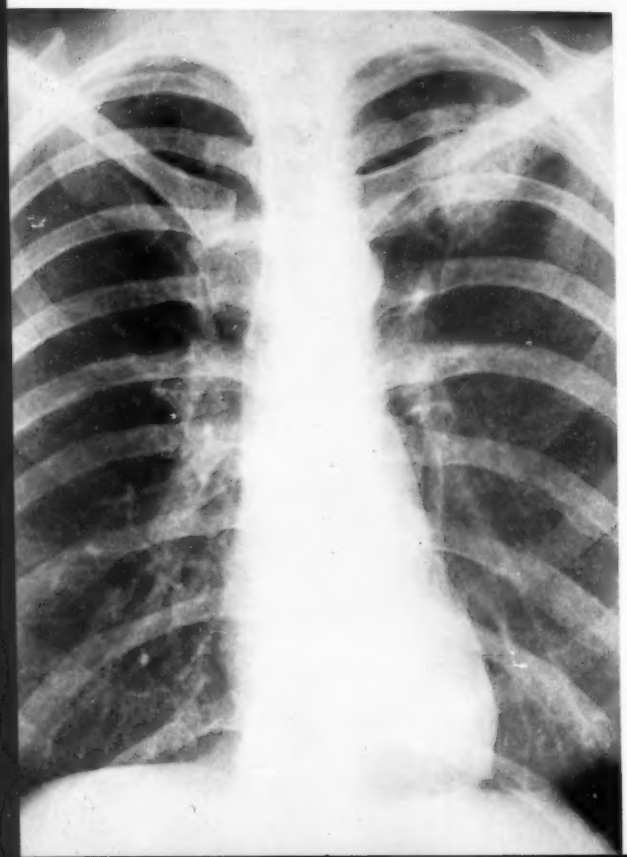
Apothegm

". . . and what art thou, execrable shape?" (Milton).

Clinical data

A 36-year-old female complained of cough, chest pain and foul sputum of one month's duration. Seven years before, a left pleural effusion had cleared spontaneously; at that time, bacteriologic and skin tests for tuberculosis had been negative. The patient had lived in New Mexico, Arizona, and Florida. There were no other clinical features of interest.

Fig. 1



X-ray findings

Over an interval of a month, there was no perceptible change in the appearance of the left upper lung field (Fig. 1). Here, a round, poorly defined, "soft" density was seen, apparently of an infiltrative rather than solid character; thickened strands extended from it to the left hilum ("drainage bands"). Despite the history, this did not look like a lung abscess. The primary radiologic consideration was tuberculosis; secondary considerations were other granulomatous lesions or unresolved pneumonia.

Clinical course

Tuberculosis could not be implicated on sputum studies and the patient did not react to histoplasmin, coccidiodin or tuberculin. Greenish brown material was aspirated from the left upper lobe bronchoscopically; cultures were negative for tuberculosis, positive for aspergillosis. Shortly afterward, the left upper lobe and the superior segment of the left lower lobe were resected. The removed mass showed an extensive purulent bronchiectasis; the pus contained numerous colonies of fungi (aspergillosis niger). The patient recovered promptly.

Epicrisis

This case illustrates a rare instance of a "bronchiectasizing aspergilloma," a tumor in which masses of fungi each lie in a bronchus, which, as a result, dilates. The mass of mycelial filaments assumes a round shape with a rough surface. This appearance resembles a truffle, and review of the x-ray confirms this interesting gastronomic simile, suggested by French authors[1]. Surgical removal is indicated. It is of interest that more of these lesions have been reported recently in debilitated patients following steroid or antibiotic therapy[2].

REFERENCES

[1]Monod, O., Pesle, G., and Segretain: Abstracted in The 1952 Year Book of Radiology. Year Book Publishers, Inc., Chicago, Illinois, 1952, p. 157.

[2]Finegold, S. M., Will, D., and Murray, J. F.: Aspergillosis. A Review and Report of Twelve Cases. Am. J. Med. 27:463-482 (Sept.), 1959.

EDITORIALS

THE TIME TO VOTE is near at hand. Peculiarly, physicians have not rarely been criticized in the past for failure to act upon this privilege. Too busy, perhaps? Nobody could possibly be too busy to perform this duty as a citizen in the presence of crises the world over.

Your Vote Is Vital

The Medical Society of the County of New York with some 7,000 members has proposed an interesting suggestion in its official bulletin, New York Medicine. Under the title "Why I'll Vote For — Nixon or Kennedy" letters were solicited from the membership to be published between now and voting day. Letters must be signed, and shall be brief.

This Journal would welcome letters from members of any of our component participating medical societies. Some interesting opinions and recommendations should be forthcoming. Matters of health and medical care are particularly timely, but the better man to represent our country in world affairs is of even greater importance.

Let us hear from you at once. But, in any event, get to the polls and do your duty!

PROBLEMS INVOLVED in the recent disagreement between Denver General Hospital and the University of Colorado School of Medicine are many and varied. Improved communications, startling increases in population, changes in political attitudes associated with world-wide and unprecedented progress in the scientific world have had their impact on the medical profession and its responsibilities to society.

What Are Medical Schools Doing?

The physician's first duty is to produce the finest medical care for the patient. Second, to improve this medical care by educating better physicians for the future and, third and in a recent very important way, to stimulate the inception and encourage completion of helpful research. That the physician's obligation to his patient is first has never been questioned down through the history of medicine. It has been assumed that what is good for the patient is also good for the doctor and a close scrutiny of the advances in medicine will support this thesis.

The medical world has always refused to horde scientific information. Patents have been frowned upon and medical knowledge as it increased has always been considered the property of the peoples of the world through communication in medical journals and more recently through close personal association of professional men in innumerable countries. Each doctor has been committed to passing on medical information to the following generation and has steadfastly borne the responsibility of this teaching duty. In fact, it has always been his opportunity to teach until recently. Since the last world war particularly, changes have occurred within medical schools in which a system employing full time teachers by the medical schools of this country has asserted its value. As a result of this, a sharp line has been drawn between those who teach and those who no longer have the opportunity to do so regardless of their ability either as physicians or as teachers. This attitude toward the professional teacher has increased the cost of medical education considerably.

In the last quarter century, medical research has brought about progress in diagnosis and treatment of disease which never before existed. The term research has developed an aura which has produced millions from the government and society in the support of any program conceived in its name. That this program must continue on a well organized basis is unquestioned.

Separation of the care of the patient from teaching responsibilities and research has been felt within teaching hospitals themselves. Some have insisted that teaching and the care of the patient could not be divorced. Others have felt that this separation was necessary—that a teacher involved in taking

care of individual patients could not maintain his objective attitude and continue his excellence in teaching if concerned about the care of the paatient. In any case a concept has developed that a medical school must control the attending staff of a hospital used for teaching purposes. This is an attitude subscribed to by the American Medical Association and the Association of American Medical Colleges and it has been without regard to the private or public ownership of an institution.

Teaching programs have often been borne under the budget restricted for patient care. Many institutions have some time ago, however, separated the cost of patient care from the cost of teaching and research and have likewise separated the budgets for these various responsibilities in hospitals. The fact that this had not been done at Denver General Hospital was one of the paramount reasons why disagreement occurred. It was almost impossible to determine the cost of patient care as opposed to the cost of teaching medical students and postgraduate students at the hospital. The cost to taxpayers of the city of Denver gradually rose, although a percentage of this cost was a responsibility of the state of Colorado and not borne by the medical school as it should have been. During the disagreement, emotional response to the problems involved became apparent. The primary disagreement, however, of the two institutions as everyone knows was not an emotional one. The medical profession in Colorado generally has been greatly concerned about the split between the medical school and Denver General Hospital. All doctors of medicine realize the importance of the use of hospital facilities in a community for teaching purposes, both on the undergraduate and postgraduate levels. That these facilities must be secured for educational purposes is unquestioned. Nevertheless, the right of independent control of its own institution is paramount in any hospital, public or private. Control is necessarily vested in the Board of Governors or, as in the case of Denver General Hospital, the Board of Health and Hospitals. Administrative control may be maintained, however, by the independent institution by reserving the right of the medical school to dictate teaching policy alone. In a democracy the problems are resolved in an ideal way by intelligent discussion of the facts and not by a demand for obscure rights and a thrust for power. We hope as taxpayers and as citizens in this country of ours this attitude maintains. As physicians, we are concerned about the education of the medical student. Let us hope that in the future a more cooperative effort may exist between the public and the private institutions in the teaching of undergraduate and postgraduate medical students.

Calvin Fisher, M.D.

*If the Shoe Fits, Put It On**

On December 31, 1959, I didn't have energy to go out and celebrate New Year's Eve so relaxed at home watching television and reminiscing. I began to evaluate good things I had accomplished and bad things done, my good points and bad points. I decided to turn over a new leaf and made some New Year's resolutions. Most of these resolutions will not apply to my colleagues, but if they do, "If the shoe fits, put it on."

Many times a patient has said to me something like this, "I will never go back to Dr. Smith. He charged me $75.00 for my last checkup, which is outrageous." Instead of looking at the ceiling and making clicking noises with my tongue, I resolve to say to this patient, "I always suspected that that son-of-a-gun was undercutting my fees."

When a patient complains that she just isn't going back to Dr. Smith because he is never at home when she calls and no one ever knows where or how to reach him, even though Dr. Smith is either out playing golf or fishing, I resolve to say to that patient, "Dr. Smith works hard, and you wouldn't want a doctor who was always available because nobody else wanted his services."

When a patient says to me, "You spent twice as long on my case, doctor, than did Dr. Smith when he examined me," my comment will be that I am not as smart as Dr. Smith and it takes me twice as long to do the same job. I will give credit to every physician

*This splendid and thought-provoking communication was submitted by a Montana colleague who prefers to remain anonymous.

in my community that he is trying to practice honest medicine and surgery, that he will not honestly take on work he doesn't feel he is capable of doing, and should he misjudge his own capabilities, let him learn from his experience and be a wiser man thereafter. It would be my privilege to help any physician out of difficulties into which he has maneuvered himself because of misjudging his own capabilities—and please listen for my yell for help when in difficulties from misjudging my own capabilities. May my patients not suffer from my not wanting to admit my need for help.

I resolve not to criticize another physician for how he practices, whether he be a general practitioner manifesting special interest in specialized fields of medicine and surgery or whether it be a specialist exhibiting interest in certain phases of general medicine and surgery. When my patient, referred to Dr. Smith, comes back and tells me that Dr. Smith said my diagnosis was far from the truth, that my treatment wouldn't do credit to a sophomore medical student, along with other equally derogatory remarks, I will not pick up the phone and give Dr. Smith a tongue-lashing. The chances are that the patient has misinterpreted Dr. Smith's remarks, has everything badly mixed up, or is just one of those imaginative persons who delights in causing trouble between one person and another. Dr. Smith's side of the story must be heard by me before my judgment is passed. If a doctor refers a patient to me, that patient will not be referred to anyone else without consulting and getting the approval of the referring doctor. Extensive workups on a referred patient that the referring doctor could do himself must not be performed by me unless requested to do so by the referring physician.

When I refer a patient to another physician, that physician will be given my explicit instructions as to the purpose of the consultation and my desires as to what that physician should do. Without such instructions, he cannot be justly criticized for doing what he thinks best for the patient.

I resolve not to try to encourage a patient to leave another physician and come to me for treatment, and not to intimate to any patient that I have any secret or fabulous cures that are not known to other physicians.

I resolve to adhere to the principles of medical ethics established by the American Medical Association and especially to Section 2 which states, "Physicians should strive continually to improve medical knowledge and skill and should make available to their patients and colleagues the benefits of their professional attainments," and to Section 8 which states, "A physician should seek consultation on request, in doubtful or difficult cases, or whenever it appears that the quality of medical care service may be enhanced thereby." We must not discredit the capabilities of other physicians nor be guilty of encouraging patients to go out of city or state for work that could be well done in our community. Let us be boosters for the medical profession in our own communities and make each a medical center for its own citizens.

Patients can be truthfully told that there is relatively little being done in medicine and surgery today that can't be done in their community. Let it be a true and defensible fact that the medical profession in our community is far above the national average as to quality, that we don't have one physician of whom we are ashamed, and that the people of this community are fortunate to have such high caliber medical personnel.

Although personally detesting politics, I resolve to take an active interest in community affairs, local, state and national politics, especially where the welfare of the medical profession is concerned, and to do whatever possible, however small or trivial it may seem, to aid the cause of American medicine. Let us defend the rights of American medicine against any group or groups of persons trying to enter the practice of medicine with anything less than medical training and licensure. Each of us should resolve to be sympathetically alert to the problems of our supporting professional groups — medical technicians, nurses, x-ray technicians, dietitians, physical therapists, and others, and lend whatever help we can to make their working conditions better.

In the affairs of our local hospitals, I resolve to use as my yardstick the following items in the order of their relative importance to medicine and patient care: First, the welfare of the patients without whom no

hospital or medical profession would be necessary; second, the welfare of the medical profession without whose skill and training a hospital would be a mere hotel; third, the welfare of the supporting and allied professions such as dentists, nurses, technicians, nutritionists, and all others without whose skill, assistance and training the physician could hardly care for patients; fourth, the welfare of the lay administrative and business personnel who facilitate the functioning of the professional groups; and, lastly, my welfare. If the others are taken care of, I will never have to worry about me.

When a female patient complains that Dr. Smith just doesn't take a personal interest in her, maybe Dr. Smith has to be reserved so as not to give his wife any cause for jealousy. When Mr. Gossip says, "I hear that Dr. Smith and his wife are having trouble," I shall say, "Which married man doesn't?" I resolve not to be guilty of starting rumors or slanderous gossip about any physician that will cast any reflection as to the state of his physical health, mental health, his ability to carry on his work, his ability to make a living for his family and for himself, and to fulfill his obligations to his wife and children. Anything within my power will be done to discredit any slanderous rumors or gossip about any physician in my community. My personal and social life as well as professional activities will be conducted so as to bring credit and respect to my profession.

Finally, I resolve to protect my reputation as a physician and the reputation of my wife and children with everything that I own and hold dear in this world, and furthermore will protect the reputation of my colleagues to the utmost of my ability. In closing, I would like to quote parts of an editorial that appeared in the American Magazine in October, 1953, entitled, "Your Reputation — What's It Worth?":

"No matter how you earn a living, you can become known and respected as a man or woman of integrity and responsibility.

"What is such a reputation worth to you?

"It is probably worth more than anything you own, and it cannot be replaced by money.

"Once a good reputation is destroyed, whether by personal misconduct or by slanderous gossip, rarely is it possible to restore it. Once lost, it is gone.

"Good reputations must be earned. They cannot be bought, borrowed, or stolen. Even when inherited, they last only so long as they are maintained. The reputation a man establishes for his family, however great he may be, will depend, in the long run, on his children and grandchildren. Likewise, when an established, highly respected business firm is taken over by new owners, their policies will determine how long they can hold the confidence of the public.

"The good reputation of any business activity, like that of any family group, is increased or decreased by the individual conduct of its representatives.

"Fairly or unfairly, what one individual does, or is said to do, reflects upon everything that he represents—his family, his business or profession, even his country.

"Sometimes we thoughtlessly allow the reputations of very good citizens, even our friends and neighbors, to be damaged by gossip or loose talk. If we would only realize how irreparable is a broken reputation, we would think twice before we jump to quick conclusions and accept as fact a slanderous rumor about someone we have learned to respect.

"Among people of good will there has always been a high respect for the value of a good reputation. Nearly 400 years ago, Shakespeare said, 'Who steals my purse steals trash; . . . but he that filches from me my good name robs me of that which not enriches him, and makes me poor indeed.'

"And 212 years ago, in the American Magazine of 1741 (the first magazine published in America), John Webbe, the editor, wrote, 'Your reputation . . . to every well taught mind, is much more valuable than life.'

"As if to emphasize the irreplaceable value of a good reputation, the same editorial denounced defamation of character as a crime that had 'made breaches in private families that could never be repaired, and given such wounds to society that ages have not been able to heal.'

"These thoughts, written 35 years before the American Revolution, reveal a profound respect for human dignity which is as American in character as our radical faith in individual freedom. Today we do not often ex-

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Radical mastectomy

*With internal mammary dissection utilizing split thickness and dermal grafts**

Paul D. Keller, M.D., and Alexandro Gonzalez, M.D., Salt Lake City

Clear and concise review of technic which enhances the hopes for cure in this disease.

THE RADICAL MASTECTOMY that was independently described and popularized by Drs. William Halsted and Willey Meyer has proved over the past half century to be the most effective treatment for control and cure of carcinoma of the breast. It is, indeed, the only method of treatment today that offers any hope of cure for those afflicted with this disease. The fundamental principles and technics which they emphasized are still practiced by good cancer surgeons. It is our belief that the en bloc in continuity resection of the internal mammary lymph node chain as advocated by Urban, Sugarbaker and others is desirable in many cases where a radical mastectomy is indicated. Enough data have now accumulated to show the virtue of extending the conventional operation for carcinoma of the breast to include the mammary chain. Experience has shown us, as well as others, that to do so is not difficult nor does it require much, if any, additional operative time. There is no significant increase in the mortality and little, if any, in the morbidity. In order to combine the use of a split graft to cover the skin defect and use a dermal graft to fill the thoracic cage defect we have developed a technic whereby a split graft and a dermal graft are used from the same area on the thigh. It is the purpose of this paper to describe our technic and report on the results of the cases we have done.

Split thickness skin grafts

There are certain fundamental requirements for an adequate operation in carcinoma of the breast: 1. Wide excision of the skin. 2. Complete extirpation of both pectoral muscles. 3. Thorough axillary dissection. 4. Removal of all tissue in one block. 5. Good hemostasis. 6. Thin skin flaps. 7. Closure without tension. If there is not wide excision of skin and if the flaps are thick, all agree that the likelihood of local recurrence is greater. Haagensen in his book on disease of the breast has nicely presented the reasons and the logic for using split grafts, even as Halsted recommended and practiced. We believe split grafts are necessary and should be used almost routinely in order to fulfill the above criteria. If one has a split graft to depend on to cover the residual defect, there is no need for worry about closure until the time has come to close the wound. Therefore, one is never tempted to retain any of the skin overlying the breast or tumor. Furthermore, if one is to cut long, thin flaps and especially if it is necessary to close them under tension, marginal necrosis is inevitable. By cutting short flaps one can make them very thin and still have an adequate blood supply to the margins. It is more expeditious to prepare a short, thin flap than a long, thin flap. If one relies upon a split graft for

*From the Surgical service of the Memorial Medical Center and Latter-day Saints Hospital, Salt Lake City, Utah.

closure there is no need for closing the flaps under tension. If all the skin overlying the mammary gland is removed, in the majority of cases it is impossible to do a primary closure without an undue amount of tension to the skin if it can be closed at all. Furthermore, the time required to cut a free-hand split thickness graft is insignificant if the thigh is prepared ahead of time in anticipation of grafting. The split graft is merely laid across the defect on the chest wall and dressed in place so that no time is required to suture it. The use of split graft has several advantages and should decrease the incidence of local recurrence and improve the functional results.

Top left. A freshly cut split graft is held above the tongue depressor with a hemostat. The donor site from which it was cut is easily visualized and is the place from which the dermal graft will be taken. The split graft was cut free-hand using a Blair-Brown knife and will be used to fill the skin defect after the flaps have been replaced.

Top right. This color print shows the outlined dermal graft. Part of it has been excised from the thigh. The dermal graft will be transplanted to fill in the chest wall while the skin defect in the thigh will be closed by primary suture.

Center left. The skin defect in the thigh has been closed with silk sutures by an assistant. It is necessary to undermine the skin around the defect in order to get a loose and satisfactory closure.

Center right. Shows the Rodman type incision used on this patient with an upper inner quadrant breast lesion. The interrupted silk sutures show the site where the tumor was excised for a frozen section. It is to be noted that all skin is removed that covers breast tissue. The incision extends well beyond the midline of the chest so that some skin is taken from the opposite side of the midline and at a safe distance from the tumor mass.

Bottom left. The operative site after an en-bloc in-continuity resection has been performed of the entire breast, both pectoral muscles, and the axillary contents, segments of the second, third, and fourth ribs and their adjacent costal cartilages, as well as the internal mammary vein with the surrounding lymph nodes and lymphatic channels.

Bottom right. The dermal graft is shown sutured in place over the defect in the anterior chest wall. It should be noted that the graft is sutured so as to cover the severed rib ends, the severed lateral margin of the sternum and the underlying lung parenchyma.

Internal mammary dissection

It has frequently been stated that the ideal surgical treatment of cancer should include the en bloc removal of the primary lesion along with the primary lymphatic drainage of said lesion before metastases to distant organs has occurred. The accumulated data of Urban, Handley, Sugarbaker, Dahl Iverson and others have established, we believe, the need for internal mammary dissection, because of the frequency with which carcinoma of the breast metastasizes to internal mammary nodes. Futhermore, the results obtained by Urban and others when this procedure is used show a significant improvement in the cure rate. The most common site of spread of breast carcinoma is to the axillary lymph nodes, but internal mammary node metasases run a close second. Handley reports in his article that of 150 cases of consecutive radical mastectomies, one-third had positive internal mammary nodes and that nearly two-thirds had positive axillary nodes. Dahl Iverson's reports showed 41 of 100 cases had positive axillary nodes and 17 had positive internal mammary nodes; only three had positive supraclavicular nodes. Eight per cent of Iverson's cases showed positive internal mammary nodes and negative axillary nodes. Urban reports on 270 cases with 35 per cent having positive internal mammary nodes and 48 per cent with positive axillary nodes. Of the cases with negative axillas a very significant 15 per cent had positive internal mammary nodes. It is very significant that 35.5 per cent of the 270 cases done by Urban, if they had had only the classical radical mastectomy, would have had metastatic disease left in the internal mammary nodes. Data such as these continue to accumulate. The incidence of metastases to the internal mammary nodes and not to the axilla is significantly higher in subareolar and inner guadrant lesions. Therefore, it would seem it is only logical that the internal mammary nodes should be removed en bloc along with the rest of the specimen. Especially is this true for all patients who have carcinoma of the breast involving the inner quadrants or the subareolar areas of the breast. In fact, it would seem from the data at hand that all patients who have carcinoma of the breast should have internal mammary dis-

section. The indication is more emphatic when one considers there is no appreciable change in the mortality or morbidity by the addition of internal mammary dissection to the conventional or classical radical mastectomy.

Dermal grafts

After an internal mammary dissection has been performed a sizable defect (about 5x11 cm.) is left in the anterior chest cage where segments of the 2nd, 3rd, 4th and 5th ribs, along with their costal cartilages, have been removed. This leaves the visceral pleura and part of the pericardium exposed. If this defect is covered only by the thin medial flap of skin as advocated by Sugarbaker eventually the patient develops a very vulnerable pliable defect that fluctuates in and out with each phase of respiration. This is objectionable to some patients. Furthermore, the severed rib ends tend to separate laterally with time and become very prominent

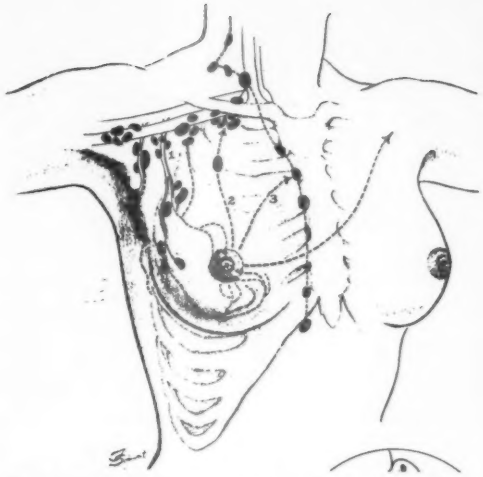

Fig. 1: This illustration is taken from the textbook, CANCER, by Ackerman and Regato. It illustrates the usual distribution of the primary lymph nodes that commonly receive metastases from cancer of the breast. Studies clearly establish that internal mammary nodes are involved with metastases almost as frequently as the axillary nodes.

TABLE 1

Number	Age at Operation	Axillary Nodes	Internal Mammary Nodes	Present Status
1	49	Positive	Positive	Alive and well 4 years 5 months
2	57	Positive	Positive	Died 1 year 3 mo. after operation
3	43	Negative	Negative	Alive and well 3 years 4 months
4	58	Negative	One node positive- 3 negative	Alive and well 2 years 3 months
5	56	Negative	Positive	Alive and well 1 year
6	65	Positive	Positive	Alive and well less than one year
7	36	One node positive	Negative	Alive and well less than one year
8	70	Positive	Positive	Alive and well less than one year

The above chart summarizes the pertinent data on the eight cases we have done. All had upper inner quadrant lesions. There were no operative deaths. The average period of hospitalization was seven days. Only one has died to date. She died of widespread visceral metastases. She had known recurrence three months after surgery. She received no palliative benefit from estrogens or androgens. They range in age from 36-70 years. It is noteworthy that six of the eight had positive internal mammary nodes. In two instances the only positive nodes were in the internal mammary chain.

through the skin. Urban uses fascia lata to fill this defect and we understand it works very well. We have had no experience with fascia lata in this situation. Inasmuch as we routinely use a split graft from the thigh, we have found it expeditious to use the derma from the split graft donor area as a very satisfactory tissue medium to fill the cage-defect and to cover the severed rib ends. The dermal graft is sutured under tension over the rib ends and to the remaining lateral margin of the sternum. A small bone drill is a great aid in placing these sutures. The skin defect in the thigh can readily be closed by an assistant without loss of time. Of course, it is necessary to undermine the skin on each side of the thigh defect in order to perform a primary closure. On the few patients we have operated on so far it has been very easy to close the defect in the thigh even for women with small thighs.

We have one patient who has gone nearly five years and three who have gone over two years in whom we have found no adverse effects from using dermal grafts. In fact, it is impossible to outline the margins of the bony defect in the chest wall by inspection. Only by firm palpation can this be done. The patients are not aware that they have bony and cartilaginous structures missing.

Summary and conclusions

1. A radical mastectomy with en bloc internal mammary dissection utilizing a dermal graft to fill the chest wall defect and a split graft from the same donor area to fill the residual skin defect is described and illustrated.

2. We believe along with Urban, Sugarbaker and others that internal mammary dissections should be included as an essential part of a radical mastectomy for carcinoma of the breast.

3. It appears from our studies of the literature and from our experience that once the concept of internal mammary dissection is widely practiced that a substantial increase in the cure rate for carcinoma of the breast will result. ●

Laboratory diagnosis of viral disease*

J. Maisel, M.D.**, C. Moscovici, Ph.D., and C. Henry Kempe, M.D., Denver

Earmark this valuable reference for your procedure file. Specific details on when and how to collect specimens and where to send them are given.

SIMPLE LABORATORY METHODS of virus diagnosis are of quite recent development. Understandably, the average medical school graduate has received little instruction in choosing and preparing specimens or carrying out laboratory studies. In the hope of giving the clinician a working knowledge of diagnostic virology, we will outline the general principles and methods essential to demonstrating and identifying viruses and their specific antibodies, in material from patients suspected of having viral infections. Our experience suggests that information on the preparation of specimens might be particularly welcomed by physicians interested in viral diseases and we hope these data will be of assistance. The cooperation of clinicians in taking well chosen

*From the Department of Pediatrics, University of Colorado Medical Center.
**Fellow of the National Foundation.

material at the appropriate time (and preparing and shipping it under proper conditions to the correct laboratory) will increase the usefulness of these specimens to the mutual benefit of clinician and virologist[1].

Fortunately, the most common viral infections are rarely serious or fatal. No one would dispute, however, that it would be a good thing to be free from their personal discomfort and economical penalties. The increasing implication[9] of the non-specific maternal prenatal virus infections in congenital anomalies and neonatal deaths, moreover, makes it urgent to achieve sharper diagnoses among all presumably viral illnesses, giving a sound basis for differentiating and preventing those illnesses which do have tragic sequelae.

Where to send specimens

No complete "routine diagnostic virus laboratory" exists in the Rocky Mountain area. The Colorado State Department of Public Health serves virus diagnostic needs in this way: Specimens for virus isolation are forwarded to either the Communicable Disease Center or the Rocky Mountain Laboratory of the United States Public Health Service, or to the Kansas State Department of Health Laboratories. The latter facilities are subsidized by the Public Health Service to act as a regional virus isolation laboratory for the Intermountain states. Specimens which might be included in specific research projects of workers at U. S. Public Health Service Laboratories are properly forwarded, others go to Topeka, Kansas. Generally, however, virus isolation is not attempted unless serologic tests on paired sera yield inconclusive information. Serologic diagnostic service for the more common infections is provided by the Colorado Department of Public Health, whose Denver laboratories† perform tests for psittacosis, eastern and western equine and St. Louis encephalitides, lymphocytic choriomeningitis, poliomyelitis, mumps, Q-fever, lympho granuloma venereum, Rocky Mountain spotted fever, and influenza. Colorado tick fever determinations are performed for the Colorado Department of Public Health by the Rocky Mountain Laboratories at Hamilton, Montana, which are part of the United States Public Health Service. Serology for ECHO and Coxsackie suspects is not available through the State Health Department at the present time. When the Colorado State Department of Public Health moves into its new quarters in 1960 it will provide a complete virus diagnostic laboratory locally. Even now, however, diagnostic needs are pretty well met by our State Health Department. *Regardless of where they are to be tested, specimens from local physicians must be submitted to their respective State Health Departments.* We hope this detailing of "who does what" will make the reader more tolerant of the delay endured before receiving a report on serologies and provide an understanding of why generally no answer is received on specimens submitted for virus isolation.

Certain diseases, being the subject of research projects of the Virus Laboratories of the Department of Medicine and of the Department of Pediatrics at the University of Colorado Medical Center, constitute exceptions to the above policies in regard to virus isolation. In these instances, specimens are welcomed, although ordinarily these laboratories are committed full time to their basic research projects. The Medicine Virus Laboratory studies unusual outbreaks of influenza and adenovirus infections. The Pediatric Virus Laboratory studies generalized vaccinia, and epidemics of infantile diarrhea. It is especially interested in the newer "numerical exanthems" such as roseola infantum, fifth disease and Boston exanthem, and would like to receive specimens from cases of diarrhea or aseptic meningitis or just plain fever, *when associated* with exanthematous rash.

Physicians wishing to submit specimens for virus diagnosis to the Pediatric Virus Laboratory should call extension 558 at the Medical Center and first discuss the case. Diagnostic service cannot be guaranteed for every unsolicited specimen falling outside our study groups. Consultation service to the extent of our ability will be available for clinical and laboratory problems, however, and we welcome calls about obscure infections and unusual epidemics. Perhaps in this

†Paired sera should be submitted to C. David McGuire, Ph.D., Chief, Laboratory Services, Colorado Department of Public Health, 430 State Office Bldg., Denver 2, Colo.

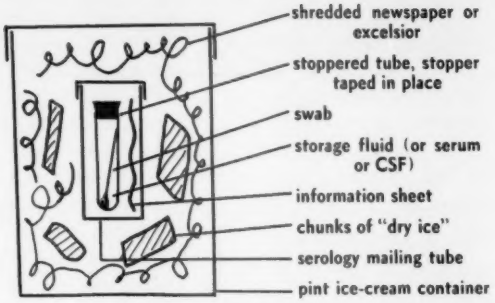

Fig. 1. Method of keeping specimens in frozen state.

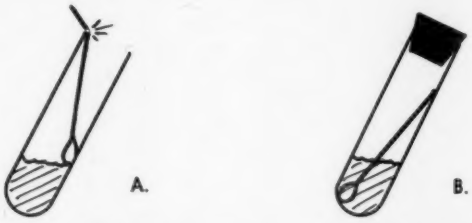

Fig. 2. Swab broken and allowed to drop in the fluid.

small way we can contribute to the existing diagnostic services.

Virus isolation

Unlike bacteria, viruses isolated from the host-cell die almost at once. Consequently, recovering a virus[1] is not as simple as streaking a several-hours-old swab on agar plates and reading them the next morning. Rather, one must keep the virus potent until it can be introduced into a susceptible host; in this host some effect must be detected.

When to take the specimen

The first three days of the illness are the opportune time. It is better when in doubt whether the differential diagnosis includes a viral etiology, to take the specimens early and store them frozen. Later when clinical features permit one to decide, the specimens can be discarded if not needed. But if they have not been taken early in the illness and then they are wanted, the best chance has been irrevocably lost.

Single cases are rarely worth studying for isolation as the chances of recovery of viruses are good only during a general outbreak.

What to do with specimens

FREEZE SPECIMENS AT ONCE! This is the first cardinal principle of virology: If a virus is to remain potent during storage until the laboratory is ready to inoculate it, the specimen thought to contain virus must be frozen as soon as it is taken. The virus laboratory will furnish tubes of fluid (Hanks' solution) into which swabs should be put before freezing; otherwise, bacteriological nutrient broth is adequate. Tissues and spinal fluids are simply frozen as is. The ice cube compartment of the ward or office refrigerator makes satisfactory temporary storage.

While on their way to the laboratory, the specimens must remain in the frozen state; otherwise, the virus will deteriorate. An arrangement whereby this may be accomplished simply is given in Fig. 1 and Fig. 2.

What the lab does with specimens

The "host" most commonly used to demonstrate virus is tissue culture. Cells of monkey kidney and other organs are separated from the parent tissue by digestion with weak trypsin; a suspension in growing medium is dispensed into test tubes. After a week the cells have grown out into a confluent sheet. Other hosts include embryonated hen's eggs, litters of suckling mice (24 hours old) and adult mice (3 weeks old).

Bacterial contamination must be eliminated from rectal and throat specimens. This is done by centrifuging, and transferring the supernatant to a sterile tube where antibiotic is added. Tissues are ground with sterile sand and made into 20 per cent suspensions in an antibiotic-containing medium. Stools are treated like tissues. The suspensions are cleared by centrifugation and the supernatant used for inoculation.

Tissue culture tubes are inoculated directly; eggs are injected via the amniotic fluid, onto the chorio-allantoic membrane, or into the allantoic sac. Mice are inoculated intracerebrally, intranasally, and intraperitoneally.

One day to three weeks may elapse before effects of the virus can be detected. Even then, to rule out nonviral toxic effects, the pathogenicity must be proven transmissible by introducing material from the first host

into a second and from the second into a third. In tissue culture, the effect of virus may be "cytopathogenic," causing the visible destruction of cells. In eggs, virus may produce "pocks" on the chorio-allantoic membrane, the death of the embryo, or impart the property of hemagglutination to the allantoic fluid. In suckling mice, paralysis and eventual death may result. Adult mice may show a wide variety of pathological results. Should an agent be recovered, it must be identified. This is done by serologic methods to be described below. A list of specimens to take in each illness is given in Table 1; the hosts used and effects produced are outlined in Table 3. (See tables, pages 43-48.)

Diagnosis by virus observation

Some viral effects[1] can be seen in histologically prepared tissue specimens with the ordinary-light microscope, as inclusion bodies within the infected cells. These may be diagnostic in themselves, and are at least helpful when present. Outstanding examples are the Negri bodies of rabies virus in brain tissue, and cytoplasmic inclusions of smallpox virus (Guarnieri bodies) in the cells of vesicle fluid. Measles and adenovirus inclusions are likewise distinctive in tissue culture cells.

Staining material for inclusions is little more difficult than preparing peripheral blood smears for differential cell counts. The air-dried, heat-fixed film is cleared 30 minutes in methyl alcohol, and Giemsa stain incubated at 37° C on the slide for 30 more minutes before rinsing and drying. Seen under the oil-immersion objective, inclusions stand out as having taken the stain more definitely than the rest of the cell. A list of materials to observe and where to locate the inclusion is given in Table 2 (page 45).

Diagnosis by immunologic methods

Hemagglutination[1,2]: Some viruses (the "myxoviruses") possess the property of causing the cells of a dilute saline suspension of erythrocytes to agglutinate visibly, so that instead of the cells settling normally into a compact red button at the bottom of the tube, a homogenous pink "shield" is formed. The viruses which "hemagglutinate" are included in Table 4 (page 48).

Hemadsorption and antibody demonstration

In addition to agglutinating erythrocytes in saline suspension, the myoxviruses when inoculated in tissue culture, can cause red cells added later to stick to the infected cells of the culture even before a cytopathogenic effect can be observed[7]. This is the phenomenon of "hemadsorption," and names one of the newer groups of viruses in which it has been noted. The viruses exhibiting the property are listed in Table 4 (page 48).

"Febrile agglutinins" of bacterial infections often give diagnostic titers in the acute phase of illness. Anti-viral antibodies, however, do not appear until convalescence. Furthermore, a given patient will have experienced wide exposure to viruses and may have low titers against many of them. Consequently, only when the antibody titer in the convalescent serum is at least fourfold higher than in the acute serum can we assign a titer against a given virus any diagnostic significance. (Fourfold titer rise means the dilution of serum still neutralizing the virus is 16 times as dilute as before the illness.) COMPARISON OF THE ANTIBODY TITERS IN PAIRED SERA is the second cardinal principle of virology.

Whole blood is taken into a sterile dry stoppered tube and allowed to clot, then the serum is harvested. The acute-phase serum is drawn during the first three days of the illness, and convalescent-phase generally no sooner than three weeks after the onset. Again, when in doubt whether viral etiology should be considered, take and store an acute blood. Blood for serology should *never* be frozen (it hemolyzes and ruins the sample) until after the serum is harvested; the *serum* may be frozen. Prolonged storage of the clotted blood should be at ice-box temperature (with the exception of material for cold agglutinins; see below); long storage of serum should be at sub-zero temperatures. Refrigeration during transportation to the laboratory is not required. The laboratory will centrifuge the sample and harvest the serum, if received unseparated.

Types of antibodies

Antibodies produced in response to a given viral infection are of one or more of

three types. The first prevents agglutination of red cells by the virus, and is the "hemagglutination inhibition" or "H-I" antibody. The second type protects the host against toxic or lethal viral effects by combining with the virus, and is the "neutralizing" antibody. The third type of antibody is demonstrated by a modified Kolmer method[2] and is the "complement fixing" or "C-F" antibody. Most often, the complement fixing antibodies are tested for, because known antigens can be used and stock antisera or virus need not be kept on hand. Again, results are meaningful only when paired sera can be compared.

Identification by serology

Should a virus be recovered, it is first tested against the patient's paired sera to determine whether a rise of "homologous" antibody has occurred in the convalescent specimen. A positive result here increases the probability that the virus isolated played an etiologic role in the patient's illness, and was not a chance finding. The clinical data is assessed, and note is taken of virus diseases prevalent in the community. Which laboratory host was susceptible to the virus is also considered. These determinations enable the virologist to pick a group of antisera prepared against known viruses, which have the highest probability of neutralizing, or inhibiting the hemagglutination of, the unknown virus. Likewise, the virologist would be able to select which complement fixing antigens to employ against the paired sera, were this type of test appropriate. A table of serologic tests made in each illness is given in Table 4.

We cannot overemphasize here the need for the clinician to submit a capsule summary of the illness, including date of onset, with his specimens and paired sera. Put yourself in the place of the virologist who has 25 ECHO, 24 coxsackie, three polio, five influenza, 18 adenoviruses, two hemadsorption viruses and countless unclassified agents to choose from, to mention only the commoner viruses. How much more "aseptic meningitis with rash" or "sore throat and muscle tenderness" tells us than the vague request for "complete virus studies." The complete virus study would require that we attempt isolation in every cell line and laboratory animal as well as in eggs, and test any recovered agent against every prepared antiserum. Obviously, no laboratory can justify such time or expense on a single specimen, and would be apt to "store it indefinitely." SUBMISSION OF A CAPSULE SUMMARY OF THE ILLNESS WHICH INCLUDES THE DATE OF ONSET is the third cardinal principle of virus diagnosis.

The isolation of a virus in laboratory viral diagnosis runs about 1 per cent of all specimens submitted, at present; we feel this could be increased by keeping the general principles in mind and following the technics presented next.

Details of taking and preparing specimens

Cold agglutinins: Because of their presence in some cases of primary atypical pneumonia, many people associate them with all viral diseases. Consequently, the most frequent request to the virus laboratory is for "viral agglutinins." As a matter of fact, only recently has a virus been definitely associated with atypical pneumonia. The only diseases for which cold agglutinins have been reported[11] are, in order of decreasing frequency, pancreatitis (mumps), atypical pneumonia, rubella, polio, measles, mumps, chickenpox and trachoma, and infectious hepatitis. The validity of cold agglutinins as a diagnostic aid for diseases other than atypical pneumonia is not generally accepted. When present, the highest titers are demonstrated in cases of atypical pneumonia.

Specimens submitted for this test should consist[11] of acute-phase clotted blood *kept warm* (body temperature) and taken promptly to the laboratory for separation of serum. This is the single exception to the general requirement of chilling blood and submitting paired samples; in this case, the cold would cause the agglutinins to adsorb, and the test would be nonreactive; the agglutinins also disappear during convalescence. This means that separate samples of serum would have to be prepared and handled differently when cold-agglutinins and other antibody determinations are requested.

Nose and throat swabs: A sterile swab is passed into the back of the mouth where it is rubbed over each tonsillar bed and the

posterior pharyngeal wall, or it is passed well into each nostril. The cotton-tip is swirled in the tube of fluid and the stick is broken off against the lip of the tube at a length to fit inside the tube when stoppered. The tube is closed tightly and placed upright in the freezer (Fig. 2).

Throat washings: Have the patient gargle with an ounce of sterile nutrient broth for 15 seconds; the material is spit into a sterile sputum-collection jar, the cover screwed tight, and the jar placed in the freezer.

Rectal swabs: The sterile swab is passed into the anus far enough that the cotton-tip is no longer visible; insertion is facilitated and collection of material ensured by first moistening the swab in the storage fluid. The swab when extracted need not have visible fecal staining to be satisfactory. It is put into the tube and stored frozen as outlined above.

Stool specimens: These give a better chance of virus recovery, and are the most common source of entero-virus isolation. Stool is collected in a clean carton and frozen promptly.

Cerebrospinal fluid: Aseptically, atraumatically obtained clear fluid is frozen promptly in a stoppered tube.

Tissues from autopsy and biopsy: These obviously should never be placed in formalin, and should be kept as sterile as possible, and the organs isolated from each other. Place the bits in separate sterile petri dishes with covers, or in sterile jars, and freeze.*

Crusts and vesicles: Crusts are scraped with a sterile scalpel into a sterile petri dish and taken to the laboratory. Vesicle fluid is withdrawn via a 25-gauge needle into a tuberculin syringes; the syringe and needle containing the fluid are put back as is into the glass tube in which the syringe came; the tube is plugged and the whole taken to the laboratory.

Effusions: Pleural and pericardial effusion fluid, or joint aspiration fluid, are treated the same as spinal fluid.

Eye washings and conjunctival scrapings: For eye-washings, the eye is bathed in saline using a sterile eye cup, and fluid transferred to a stoppered tube and frozen. Eye-lid scrapings are most productive when taken from the upper tarsus, near the inner border; the stick is swirled in the storage fluid until the material is washed off, and the stick is discarded and the tube stoppered and frozen.

Buboes: These are treated as vesicles.

Whole blood: Viremia can be demonstrated by isolating virus from blood taken early in many illnesses. Ideally, heparinized blood is preferred, but a clotted tube is perfectly acceptable. In either case, freeze the blood promptly. It must be realized that if the sample for viremia is frozen a *separate* one will have to be provided for acute-phase serum.

Urine: Urine is a good source of virus and should be studied more than it has. Have the patient void into a sterile jar, transfer a portion to a stoppered tube and freeze promptly.

Serum: A "clotted tube" of blood is collected and stored in the refrigerator. If aseptic technic is adhered to, the serum may be separated; the serum should then be kept frozen. *Remember*: clotted tubes for serology are never frozen until the serum is separated; clotted tubes for cold-agglutinins are never put in the refrigerator. •

*Plastic freezer bags may be substituted.

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TABLE 1

Specimens required for laboratory diagnosis (1, 5, 6, 8)

Illness	Agent(s)	Materials to be taken
Central nervous system		
Paralytic disease	Poliovirus, types 1, 2, 3 Coxsackie virus, type A7 ECHO virus, type 2	Throat washing or swab Stool or rectal swab Cerebrospinal fluid Postmortem brain (especially medulla and spinal cord) Muscle biopsy or postmortem specimen Paired sera
Aseptic meningitis	Mumps Coxsackie virus, groups A and B ECHO viruses Herpes simplex Lymphocytic choriomeningitis Lymphogranuloma venerum Psittacosis Polio virus	Throat washing or swab Stool or rectal swab Cerebrospinal fluid Postmortem brain (especially medulla and spinal cord) Scrapings from fever sores (Herpes) Swabs of oral lesions (Herpangina) Acute-phase clotted blood Buboe aspiration fluid (LGV) and node Paired sera Sputum (Psittacosis)
Meningo-encephalitis	Encephalitides: Eastern equine Western equine St. Louis Japanese B Mumps Measles Rabies Rubella	Throat washing or swab Stool or rectal swab Cerebrospinal fluid Acute-phase clotted blood Postmortem brain and spinal cord Saliva (rabies) also Sub. Max. gland, Hippocampus Nasal swab (measles and rubella) Paired sera
Guillain-Barre syndrome	Coxsackie group A viruses	Throat washing or swab Stool or rectal swab Cerebrospinal fluid Paired sera
Cardiovascular system		
Myocarditis, newborn and adult	Coxsackie group B viruses	Throat washing or swab Stool or rectal swab Postmortem heart Paired sera
Respiratory system		
Stomatitis and/or pharyngitis Herpes simplex Herpangina Non-bacterial pharyngitis Adeno-pharyngo-conjunctival fever	Herpes simplex virus Coxsackie group A viruses Adenoviruses Adenoviruses	Throat washing or swab Stool or rectal swab Swab of oral lesions Paired sera
Common cold	No virus isolation to date	
Non-specific "U.R.I." including acute respiratory disease (ARD)	Adenoviruses Hemadsorption viruses, types 1, 2 ECHO viruses, types 8, 10, 11, 20	Throat washing or swab Stool or rectal swab Paired sera
Influenza	Influenza viruses, types A, A′, B, C, D	Throat washings* *must be frozen at once Postmortem lung Paired sera

TABLE 1—Continued

Illness	Agent(s)	Materials to be taken
"Croup" laryngotracheo-bronchitis	Group-associated (CA) virus	Throat washing or swab Stool or rectal swab
	Hemadsorption type 2 virus	Paired sera
Bronchiolitis (peribronchiolar pneumonia)	Hemadsorption viruses types 1, 2	Throat washing or swab Stool or rectal swab Paired sera
Pleurodynia (Bornholm disease)	Coxsackie group B viruses	Throat washing or swab Stool or rectal swab Pleural effusion fluid Paired sera
Primary atypical pneumonia	Primary atypical pneumonia (PAP) virus	Acute-phase serum for cold-agglutinins Throat washing Paired sera
Ornithosis (psittacosis)	Psittacosis virus	Throat washing Acute-phase clotted blood Paired sera
Ophthalmic disease		*The same samples are taken for all*
Ocular herpes	Herpes simplex virus	Eye washing
Epidemic-kerato-conjunctivitis	Adenovirus type 8	Tarsus scraping Throat washing
Trachoma	C. trachomatis virus	Paired sera
Inclusion blenorrhea	C. oculogenitale virus	
Systemic diseases		
Measles	Measles virus (Rubeola)	Naso-pharyngeal swab Clotted blood, during prodrome only Paired sera
Rubella	Rubella virus (No isolation to date)	Naso-pharyngeal swab Clotted blood, first day of rash only Paired sera
Smallpox	Variola virus	Clotted blood, acute-phase Crusts Vesicle fluid Postmortem liver and spleen Paired sera
Vaccinia (cow-pox)	Vaccinia virus	Clotted blood, acute-phase Crusts Vesicle fluid Postmortem liver and spleen Paired sera
Chickenpox	Varicella virus	Clotted blood, acute-phase Crusts Vesicle fluid Postmortem organs, especially lung Paired sera
Yellow fever	Yellow fever virus	Clotted blood, acute phase (first 3 days) Postmortem liver Paired sera
Infantile diarrhea	ECHO viruses, notably type 18	Stool or rectal swab Paired sera
Cytomegalic inclusion disease	Salivary-gland virus	Saliva Urine Paired sera
Colorado tick fever	Colorado tick fever (CTF) virus	Clotted blood, acute-phase Paired sera
Dengue	Dengue virus	Clotted blood, acute-phase Paired sera

TABLE 1—Continued

Illness	Agent(s)	Materials to be taken
Diseases of presumed viral etiology (transmissable, but agent not recovered in laboratory)		
Hepatitis, infectious and serum		Serum for biochemical tests
Infectious mononucleosis		Acute serum for Bunnell test Differential white-cell smear (Downie cell)
Roeola infantum		No laboratory tests

TABLE 2

Inclusion bodies as diagnostic aids (1)

Illness	Material	Location of inclusion, with name
Rabies	Brain sections	Intra-cytoplasmic Negri
Smallpox	Vesicle fluid, in cells	Intra-cytoplasmic Guarnieri
Vaccinia	Vesicle fluid	Intra-cytoplasmic
Chickenpox	Vesicle fluid	Intra-nuclear
Herpes zoster	Vesicle fluid	Intra-nuclear
Herpes simplex	Fever sore swab, in tissue culture	Intra-nuclear
Yellow fever	Liver sections	Intra-nuclear Hoffman Intra-cytoplasmic Councilman
Lymphogranuloma venerum	Buboe fluid, in mononuclear cells	Intra-cytoplasmic Gamma
Trachoma	Conjunctival scrapings	Intra-cytoplasmic
Ornithosis	Spleen or air sac of suspected bird or patient	Intra-cytoplasmic (endothelial cells)
Measles	Tissue culture cells (human kidney)	Intra-nuclear
ARD-adenovirus	Tissue culture cells (HeLa)	Intra-nuclear
Cytomegalic inclusion disease	Urinary sediment organs	Intra-nuclear

TABLE 3

Virus isolation procedures (1)

Virus	Host(s) Used	Route*	Effects to observe
Polio	Live monkey	I.C.	Paralysis
	Tissue culture Monkey kidney HeLa K.B.	Direct	Cytopathogenic effect
Coxsackie	Suckling mice (1 to 2 d.)	I.P., I.C.	Group A: Flaccid paralysis, myopathy Group B: Spastic paralysis, necrosis of fat pad, pancreas, brain (takes 2-5 days; may require blind passage)
	Tissue culture Monkey kidney (B, 1-5; A, 9, 14) HeLa (B, 1, 3, 5; A, 11, 13, 15, 18) K.B. (B, 1-5; A, 9, 11, 15, 18)	Direct	Cytopathogenic effect

TABLE 3—Continued

Virus	Host(s) Used	Route*	Effects to observe
ECHO	Tissue culture Monkey kidney (1-20, 22-25) Human amnion (#21)	Direct	Cytopathogenic effect
Herpes simplex	Embryonated egg, 12-13 days	Chorioallantoic membrane	Pocks on membrane after 2 days
	Tissue culture HeLa "L" cells Rabbit kidney	Direct	Cytopathogenic effect Intra-nuclear inclusions
	Suckling mice, 1 day	I.P.	After 36 hours, up to 3 days, hyperactivity, under-nutrition, cyanosis, abdominal distension, and death following an ascending paralysis
	Rabbit cornea	Scarification	Keratoconjunctivitis within 7 days
Encephalitides Lymphocytic chorio-meningitis Eastern equine *Western equine *Japanese B *St. Louis	Suckling mice, 3-6 days	I.P., I.C.	After up to 20 days, roughening of coat, inactivity, tremors, hunched-back, circling, stiff-tail, paralysis, convulsions (produced by spinning animal by tail)
	Guinea pigs, unweaned	I.P., I.C.	After up to 20 days, fever above 40° C (rectally) for more than 2 days; weakness. tremor, incoordination, salivation, convulsions, and paralysis
	Embryonated egg, 9-12 days	Yolk sac Chorioallantoic membrane Amniotic	Death of embryo no sooner than 12 hours incubation
	Tissue culture (*items only) Hamster kidney	Direct	Cytopathogenic effect
Psittacosis	Embryonated egg, 7 day	Yolk sac	Death of embryo in 3-8 days; intra-cytoplasmic inclusions in cells lining the yolk sac
	Embryonated egg, 9 day	Allantoic	Death of embryo in 4 days, inclusions
	Young mice, 21 days	I.N., I.C., I.P.	After 3 to 8 days, hunched posture, apathy, labored respirations and death; see intra-cytoplasmic inclusions in endothelial cells of diseased organs (lung, spleen)
	Guinea pigs	I.N., I.C., I.P.	After up to 20 days, febrile illness and death (usually within 5 to 10 days) Sacrifice part of animals on 10th day, see fibrinous serositis and pneumonitis
Lymphogranuloma venereum	Same as psittacosis	Same as psittacosis	Same as psittacosis
Mumps	Embryonated egg, 7-8 days	Amniotic	After 5 to 7 days' incubation amniotic fluid will hemagglutinate chicken erythrocytes

TABLE 3—Continued

Virus	Host(s) Used	Route*	Effects to observe
Measles	Live monkey	I.N.	Febrile illness with rash
	Tissue culture	Direct	Cyptopathogenic effect (syncytial giants)
	Chick embryo cells		
	Human kidney		
	Human heart		
	Dog kidney		
	Monkey kidney		
	K.B.		
	Embryonated eggs		
Rabies	Young mice, 21 days	I.C.	After up to 28 days, usually in 6 to 8, hump-back, rough fur, conjunctivitis, hyer-activity, incoordination, paralysis and death after seizures or prostration. Make impression smears and sections of brains; observe Negri bodies
Varicella	Tissue culture	Direct	Cytopathogenic effect
	Monkey kidney		Intra-nuclear inclusions
	HeLa		
	Human amnion		
	Human foreskin		
Variola	Embryonated eggs, 10-13 days	Chorioallantoic	Pocks on chorioallantic membrane
	Tissue culture		
	"L" cells	Direct	Cytopathogenic effect ("agglutination")
Vaccinia	Same as variola	Same as variola	Same as variola
Yellow fever	Monkey	S.C., I.P.	Monkey shows pathology of yellow fever; monkey's blood passed into mice
	Young mice, 21 days (may inject original material directly also)	I.C., I.P.	Virus is recovered in mice from monkey blood or from original material; mice die with hepatic necrosis and encephalitis after 5 days
Dengue	Adult mice	I.C., I.P.	Should be nothing to observe
	Suckling mice, 2-4 days	I.P., I.C.	Likewise, nothing to observe after 9 to 21 days, paralysis and death; brain suspension from these mice will hemag-glutinate chicken erythro-cytes
Colorado tick fever	Suckling mice, 3-5 days	I.C., I.P.	Weakness, hyperexcitability and death in 48 hours
	Tissue culture		
	K.B.	Direct	Cytopathogenic effect
Influenza	Embryonated eggs, 10 days	Amniotic	After 3 days, amniotic fluid will hemagglutinate chicken erythrocytes
	Young mice, 21 days	I.N.	Pneumonitis and death
	Tissue culture	Direct	Cytopathogenic effect
	Mouse lung		
	Chick embryo cells		
	Monkey kidney (only by adaptation)		

TABLE 3—Continued

Virus	Host(s) Used	Route*	Effects to observe
Adenovirus	Tissue culture HeLa	Direct	Cytopathogenic effect Intra-nuclear inclusions
Hemadsorption	Tissue culture K.B. (type 1) Monkey kidney (type 2)	Direct	Cytopathogenic effect Hemadsorption
Croup-associated	Tissue culture Monkey kidney	Direct	Cytopathogenic effect Hemadsorption
Salivary-gland (cytomegalic)	Fibroblast line Human foreskin	Direct	Cytopathogenic effect I.N. inclusions
Primary atypical pneumonia	Embryonated eggs	Amniotic	Demonstration by flourescent-antibody technic in bronchial epithelium of embryo

TABLE 4

Type of antibody present in virus diseases (1, 7)

Illness or Virus	Antibody Test Usually Performed
Poliomyelitis	Neutralization, complement fixation
Coxsackie	Neutralization, complement fixation
ECHO	Neutralization
Lymphocytic choriomeningitis (LCM)	Complement fixation
Measles	Complement fixation, neutralization
Mumps	Hemagglutination-inhibition, neutralization, complement fixation, hemadsorption-inhibition
Herpes (zoster and simplex)	Complement fixation
LGV	Complement fixation
Rabies	Complement fixation
Encephalitides	
Japanese B	Complement fixation, hemagglutination inhibition
St. Louis	Complement fixation, hemagglutination inhibition
Western equine	Complement fixation, hemagglutination inhibition
Eastern equine	Complement fixation
Adenovirus	Hemagglutination-inhibition, neutralization, complement fixation
Influenza	Hemagglutination-inhibition, complement fixation, hemadsorption-inhibition
Ornithosis (psittacosis)	Complement fixation
Colorado tick fever	Complement fixation, neutralization
Smallpox	Hemagglutination-inhibition, neutralization, complement fixation
Vaccinia	Hemagglutination-inhibition, neutralization, complement fixation, hemadsorption-inhibition
Yellow fever	Neutralization, complement fixation
Croup associated (CA)	Hemagglutination-inhibition, hemadsorption-inhibition, neutralization
Hemadsorption (HA_1 and HA_2)	Hemagglutination-inhibition, hemadsorption-inhibition, neutralization, complement fixation
Primary atypical pneumonia	Cold-agglutinin
Infectious mononucleosis	Heterophile
Cytomegalic inclusion (salivary gland virus)	Complement fixation

The two new ingredients*

Francis Boyer

Two comparatively recent developments are helping meet the spiraling costs of medical care. These are the development of voluntary health insurance plans, and the development of potent new drugs which enable many patients to stay out of the hospital and shorten the time others must remain there.

ORIGINALLY THE SUBJECT OF THIS TALK was to have been the part the pharmaceutical industry has played in the advances of modern medicine. Its original title, and the one which appears on the program, was "The New Ingredient," for today's drug therapy has been developed only in the last few decades.

But, as I worked on the talk, it gradually came to me that in the tremendous strides which have been taken toward the betterment of our nation's medical care, there was another new factor, economic rather than medical, the development of voluntary health insurance, which is making these advances available to all our people. So, my address has ended up with the title, not "The New Ingredient," but "The Two New Ingredients," for the combination of the new drug therapy and voluntary health insurance has indeed revolutionized the medical care of our nation. I apologize herewith for giving the wrong title to the people who printed up the program.

In the early 1930's the American Hospital Association foresaw the problem of rising hospital costs and began to convince our people that the solution should be an American solution, not reliance on government help, but through self-help, through voluntary insurance plans. In this crusade they have received invaluable assistance from the Health Information Foundation. This organization, under the leadership of my friend George Bugbee, has ably carried out the social and economic research so imperatively needed to better our health services and to secure for our people adequate coverage on a sound financial basis.

Today almost 70 out of every 100 Americans are protected by Blue Cross and Blue Shield, or by the private companies. This is an extraordinary achievement. No major nation in the world's history has ever before come so close to providing health security for all without a compulsory government system.

Of course, much remains to be done in expanding coverage so that a medical catastrophe will not wreck a family's whole financial structure. Obviously, too, the extension of the life span brought about by modern medicine is forcing us to face new problems. By 1975 it is expected that 10 per cent of our people will be over 65 and will require 25 per cent of all the general hospital days.

I have no easy answer to this problem, though I suppose my industry is in part responsible for it. But the groundwork for its solution has been laid, and I know that the problem will be solved by the creative ability which your association has already exemplified. A recent editorial in *The New York Times*, "Health Insurance Gaps," concluded with the words, "It is clear from the public point of view that the wider the coverage of voluntary insurance, the better . . . if we are

*An address delivered by Mr. Francis Boyer, Chairman of the Board, Smith Kline & French Laboratories, at the 61st Annual Meeting of the American Hospital Association, New York City, August 21, 1959.

to avoid compulsory government insurance in the United States."

And, "Let the government do it" is pretty dangerous doctrine. Last April, Secretary of the Treasury Anderson, in his address before the Associated Press, emphasized the lesson of history.

"In writing of the Greeks and Romans, one of our greatest classical scholars summed up their story in these words: 'In the end, more than they wanted freedom, they wanted security, they wanted a comfortable life, and they lost it all—security and comfort and freedom. . . . When the Athenians finally wanted not to give to society but for society to give to them, when the freedom they wished most was freedom from responsibility, then Athens ceased to be free and was never free again.' "

Voluntary insurance

The outstanding document, the Bayne-Jones Report, stresses "the importance of diversity of federal and non-federal sources of support in medical research and education," and the principle is just as applicable to our hospital system. Unquestionably, government funds will to some extent have to be supplied for hospital support. For example, state or local governments must universally assume the responsibility now foisted on the hospitals for the treatment of indigent patients. Private charity will help, though under today's tax structure, individual giving is a pretty broken reed. But voluntary insurance of the whole community, the aged as well as the younger working group, must be our main reliance in the financing of hospital services.

I am convinced that in this effort private enterprise, as represented by the corporations of America, has an important role to play. If we are to avoid dependence on centralized authority, our corporations must increasingly provide adequate medical insurance covering not only their employees but also their retired group.

Progress is being made in this direction. A United States Department of Labor study of 100 selected health plans in effect in early 1958 showed that with 43 firms the benefits for regular employees, with some limitations, were extended to retired employees and their dependents. But the remaining 57 concerns must be persuaded to follow this example.

It also seems to me that our corporations in many cases could well contribute a larger share of their earnings to charitable support. The 1955 report on company contributions of the National Industrial Conference Board reveals that, through themselves or through sponsored foundations, the companies studied gave away 0.7 per cent of their net income before taxes. Forty per cent of this money went for social welfare, including the Community Chest; 31 per cent for education. Hospitals received only 8.6 per cent of the money contributed. That means that representative corporations gave to hospitals direct only *six one-hundredths of one per cent* of their income before taxes.

One often hears the objection that the officers of a corporation have no right "to give away the stockholders' money," but after all there is an easy mechanism for meeting this objection. Let there *be* a decision of the stockholders on this point. Let management, after due consideration, bring in a proposal at the annual meeting that x per cent of profits before taxes be expended for charitable purposes. I definitely feel that most stockholders would approve a higher percentage for such giving than is at present in effect. (As you know, the government allows 5 per cent of profits to be classed as a charitable deduction.)

Admittedly, really effective support cannot come from industrial management alone. It must have a wide base. It can only come when enough members of the community from all walks of life become aware of the problems faced by the hospitals and are more active in trying to aid the hospitals. But the corporation again can help bring this about. At Smith Kline & French we recently inaugurated a plan to add to hospital funds and at the same time to strengthen our employees' understanding of, and concern with, hospital problems. The plan is a simple one. It consists of a matching gift program, through which the company will duplicate any gift up to $2,000 which an employee donates to a hospital of his choice. The plan is not too difficult to carry out, and it encourages voluntary, grass roots support.

You see, I have a deadly fear of centraliza-

tion, of the "from each according to his abilities, to each according to his needs" of the Marxian doctrine. It sounds so nice, but look what it has produced. I vastly prefer utilizing our existing system of private enterprise, which after all has made American life the envy of other nations, including even our Russian antagonists.

In our Western democracies today there seems to be a kind of inferiority complex, a rather morbid wave of self-criticism, a tendency to point out all the possible defects in our private enterprise system, while turning a blind eye on what it has accomplished. As that outstanding publication of the Foreign Policy Research Institute, "Protracted Conflict," phrases it, "So defensive has the Western mentality become that many intellectuals devote most of their time to apologizing for the institutions and the process of liberal society." And regrettably, the spokesmen for private industry have on the whole been pretty inarticulate in pointing out what the American system has accomplished.

This is certainly true for the pharmaceutical industry. There is indeed some recognition that the new "miracle drugs" are to a great extent responsible for our gains in the battle against disease. Curiously enough, however, the public at large—and its representatives in Congress—seem unaware of the part which the pharmaceutical industry has played in the development of these miracles. The great majority of our people would credit the creation of the new drugs to the medical profession, to research institutes, or—more recently—to government research. Let me give you an example of what I mean.

Pharmaceutical industry

The National Health Education Committee recently issued a beautifully done facts book on the major killing and crippling diseases in the United States today. Its principal emphasis is upon what medical research has accomplished in the past and what, with increased support, it can accomplish in the future. It points out, for example, the reduction in the tuberculosis death rate from 45 per 100,000 in 1939 to 7.5 per 100,000 in 1957. It emphasizes the new era in the field of mental illness brought about by the tranquilizing drugs. And in the almost 300 pages of the facts book I have been able to find but one page which mentions the part played in these accomplishments by the pharmaceutical industry.

It seems to me, therefore, that the time has come to make our people and our legislators more conscious of the part played by the pharmaceutical industry in the medical advances of the last few decades. I shall point out in a moment that in the final analysis these advances are due to the cooperation of the whole health team.

The chief reason for the anonymous character of pharmaceutical research is that our business has never told its own story. The ethical pharmaceutical industry has been understandably reluctant to claim credit for advances in medicine for fear that by so doing we might seem to belittle the role played by the medical fraternity. The medical profession is our senior partner and also the customer on whom our well-being depends.

Indeed, the outstanding development in medical research during the last few decades has been the inauguration of a close and effective cooperation between the pharmaceutical industry and academic scientists, clinical investigators and practicing physicians. This cooperation is increasingly being carried out in an atmosphere of mutual trust and confidence.

In 1943, only 16 years ago, there was published my sole contribution to medical literature, a paper in *The New England Journal of Medicine*, entitled "The Pharmaceutical Manufacturer and Academic Research."

In this paper I made an earnest plea for increased cooperation between academic scientists and commercial houses. In 1954 in behalf of my firm I had the honor of accepting an award from the American Medical Association for the "outstanding contributions to medicine" of SK&F's television programs. In my little speech of acceptance I was able to point out that my *New England Journal* article had really been pretty naive. It had considered academic-commercial collaboration as a Utopian vision of the distant future, whereas in 11 years it had become an accomplished fact.

This is just one illustration of the newness of today's pharmaceutical industry. It is indeed a very recent phenomenon. Even up

through the 19th century, the discovery and development of new therapeutic agents was almost invariably made by academic medicine, chemistry, or pharmacy. For example, Professor Geiger and his co-workers in pharmacy at Heidelberg isolated atropine in 1835, and aspirin was discovered in 1853 by an academic chemist, Charles Gerhardt, a member of the Science Faculty of Montpellier. The development in Germany of industrial chemical research toward the end of the 1800's foreshadowed a new era, but the United States was terribly backward in both chemical and pharmaceutical research until the outbreak of World War I.

Insulin in 1921

It is a bit futile to try to put an exact date on the beginning in America of the production of new and effective drugs by the pharmaceutical industry, but, roughly speaking, the present flow of products from pharmaceutical laboratories might be said to have begun with the collaboration of Eli Lilly and Company with Drs. Banting and Best in the production of insulin in 1921, to be followed in 1928 by their similar collaboration on liver extract with Dr. George Minot. The liver extract story will always be particularly vivid in my own remembrance since I happened at that time to be seeing a good bit of Dr. Minot. He had roomed with my brother at Harvard and did much to guide SK&F's faltering steps in research. In those days, SK&F's whole research establishment consisted of one M.D. and two Ph.D.'s in chemistry, another illustration of how recent the whole process has been. Today our Research Division comprises 750 people in Philadelphia with another 50 in the SK&F Institute in London.

It is fair to say that the American pharmaceutical industry began to have an important part in the health drama only some 30 years ago, and it is, therefore, not surprising that the public at large still has a tendency to think in terms of the prior situation, when drug discoveries were indeed made, as I have indicated, almost wholly by individual physicians, pharmacists and chemists.

But as time goes on, more and more the birth of the new compound, the original idea, takes place in the laboratory of a commercial concern. A recent article in the *Financial Times of London* refers to penicillin as "one of the last of the great free lance discoveries," and Dr. Watt, director of our National Heart Institute, recently reported to the Senate Appropriations Committee, "The major strides in drug discoveries of the past few years . . . have been made within commercial pharmaceutical houses."

For example, folic acid was synthesized by Lederle in 1945 after four years of work. Isoniazid, which as you know, is today the standard anti-tuberculosis drug, was announced in 1952 after a neck-and-neck race between Squibb, Hoffman - LaRoche and Bayer. I might add that the United States pharmaceutical industry in 1958 spent approximately $177 million in research and development, of which some $20 million was given for the support of medical schools, hospitals and similar institutes, or for the financing in them of medical research.

Similar picture

Let us turn for a moment to the other side of the Atlantic. Here again we find a similar picture. The antihistamines came into being in the laboratories of the great French house of Rhône Poulenc, their genesis being the work of Bovet in 1937. At Rhône Poulenc under Bovet were likewise developed in 1946, "Diparcol," the first synthetic derivative effective against Parkinson's disease, and in 1947 the first synthetic curare product.

These are only some of the advances in medicine which might not exist if it were not for pharmaceutical research. The accomplishments of this research are the result of medico-industrial collaboration and of an alert, dynamic industry's unceasing efforts to succeed in a highly competitive market. They are the result, in short, of a free economic system. If one accepts around 1920 as the date when the modern pharmaceutical industry really began to function, it would appear that it is of about the same age as the Soviet Republic. There are holes in the analogy, of course, but it is at least interesting to note the new therapeutic agents contributed by individual enterprise in the western world and then to look in vain for their counterparts in the monolithic Soviet system.

One certainly does not associate present-

day Great Britain with any prejudice in favor of private medicine or private industry, so that the following statements from the so-called Hinchliffe Report are of particular significance. I should explain that the Hinchliffe "Committee on Cost of Prescribing" made its report to the British Ministry of Health in regard to the cost of prescriptions issued under the National Health Service.

Significant discoveries

The section of the report entitled "The Discovery of New Drugs" gives a number of illustrations of how "some of the significant discoveries of the last 30 years were made." It points out that "the first drug to be effective in the treatment of bacterial infections," prontosil red, was discovered by Domagk and Meitzsch and Klarer, "all working in the laboratories of the German firm, I. G. Farbenindustrie." The Pasteur Institute found that the activity of prontosil was due to sulfanilamide; but May and Baker developed sulfapyridine, and "all subsequent sulphonamides, such as sulphathiazole, sulphadiazine and sulphadimidine, were developed in the laboratories of pharmaceutical firms."

The report then gives a brief history of penicillin from the original work of Sir Alexander Fleming at Saint Mary's Hospital, notes the contributions of Florey and Chain and points out "the development of processes for the production of penicillin on a commercial scale was carried out in the U.S.A." It recounts the discovery of streptomycin in 1944 by Waksman and his colleagues at Rutgers and then adds: "All subsequent antibiotics have been discovered by scientists working in the laboratories of pharmaceutical firms, almost all in the U.S.A." (Incidentally, and not mentioned in the report, Waksman did his work under a grant from Merck.)

This section of the report ends with the history of cortisone, from the isolation of the cortical steroids by Reichstein, working both in the University of Basle and in the Ciba Laboratories, the isolation of compound E by Kendal and the great clinical advance made by Hench. It adds "the extremely difficult technical problem of commercial production of cortisone was tackled by the firm of Merck & Co. in the U.S.A. . . . further developments such as the discovery and manufacture of hydrocortisone and of prednisolone and of their fluoro-derivatives came from the pharmaceutical firms."

In another section of the report, the Hinchliffe Committee makes the point which is the fundamental justification for my talk before you here:

"We were concerned to note the totally inadequate publicity given to the remarkable saving in life, improvement in health, increase in efficiency and saving on expensive institutional treatment which all stem from, among other things, the use of new drugs."

From our own country, consider the statistics presented by Dr. William S. Middleton, Veterans Administration Medical Director, before the Senate Appropriations Committee this June. Dr. Middleton said the VA had almost 16,000 tuberculosis patients in its hospitals in 1954. Last year that figure had declined to about 10,000. Dr. Middleton added, "If we were to resolve that reduction into the actual cost of maintenance of beds for tuberculosis, it would amount to $107 million," and he gave full credit to new chemical agents developed by private industry. Dr. Middleton's testimony also revealed that the VA is now discharging about 41,000 mental patients a year, in contrast to about 28,000 a year before the tranquilizing drugs were developed.

Now these are cold statistics, albeit impressive ones. But think of them in human terms; the thousands of people who in all probability would have been dead or crippled, who would have been locked in the back wards of our mental hospitals, who would have been bedridden invalids—but who, today, are leading normal, productive lives. Then perhaps we can better realize the contribution to our nation's welfare made by modern drug therapy, the first of the new ingredients in the prescription for our nation's health.

As to the second new ingredient, voluntary health insurance, I am certain that this association will provide the imaginative leadership it has so signally demonstrated in the past. Our people will follow this leadership. They will not abandon the economic problem of modern medicine to the mercies of a socialized government. They will solve it by private initiative, by the American way. •

The community and rehabilitation of handicapped citizens*

Frank H. Krusen, M.D., Rochester, Minnesota

In no field is close teamwork more obviously essential than in helping the handicapped back along the road of useful citizenship.

REHABILITATION HAS BEEN DEFINED as "the restoration through personal health services of handicapped individuals to the fullest physical, mental, social and economic usefulness of which they are capable, including ordinary treatment and treatment in special rehabilitation centers." In recent years rehabilitation has come to be regarded as a creative procedure in which the physical, mental, vocational and social abilities of the disabled person are developed to the greatest degree of effectiveness. It includes the cooperative efforts of various medical specialists, therapists and counselors to improve the physical, mental, social and vocational aptitudes of persons who are handicapped, with the objective of preserving their ability to live happily and productively on the same level and with the same opportunities as their neighbors.

Today it is agreed that we should avoid an attitude of hopelessness or passive acceptance in the face of chronic disability, and that a dynamic approach to the care of the seriously disabled frequently results in restoration of such persons to self-sufficiency, self-respect and happiness. It is now agreed that an attempt should be made to return each handicapped person to a normal living and working environment, or to the most suitable, alternate conditions possible.

Teamwork

Many minds and skills meet on the rehabilitation team which, under the leadership of a medical director, works from the beginning of a person's disability and does not delay rehabilitation efforts until it is too late to achieve the best results. The health worker who puts off efforts at rehabilitation until the patient is so seriously handicapped that rehabilitation is extremely difficult reminds me of the medical student who delays preparation for his final examinations until a few days before the examinations are given.

I know of one lay observer who said that he had closely followed the work of a rehabilitation center in New York City and yet, he said, he "had missed the emergence through it of the miracle of the composite science of rehabilitation. Suddenly," he continued, "I realized that its staff was using medicine and surgery, therapy, psychology and psychiatry, patience, kindness, friendly understanding and vocational training in their efforts to help the physically handicapped re-educate themselves to live and work and love by enlisting their minds, hearts, and bodies."

One of our great leaders in the field of vocational rehabilitation in the United States has said, "Rehabilitation is a bridge, spanning the gap between uselessness and usefulness, between hopelessness and hopefulness, between despair and happiness."

Humanitarian efforts such as you are

*Address given at the dedication of the Gottsche Rehabilitation Center, Thermopolis, Wyoming, June 27, 1959. Dr. Krusen is from the Section of Physical Medicine and Rehabilitation, Mayo Clinic and Mayo Foundation.

making in the establishment of this rehabilitation center are based on religious understanding. The fact that you have decided to be your brothers' keepers indicates that you are not like the student in a class in religion who thought that Sodom was the husband of Gomorrah, or the sweet, young freshman co-ed who thought the Epistles were the wives of the Apostles.

It is my hope that you will continue your voluntary efforts in support of this center, and that even though you may seek governmental aid, you will not rely too heavily on such aid.

Three essentials

Proper restoration of any handicapped person depends on three things: (1) appropriate definitive treatment in the hospital and complete physical and psychological rehabilitation in the rehabilitation center; (2) proper vocational rehabilitation; and (3) well-established programs for employment of the handicapped.

Rehabilitation has acquired new connotations growing out of recent experience. "It has come to be regarded as a creative process, in which the remaining physical and mental capacities of the physically handicapped are utilized and developed to their highest efficiency. It is an organized and systematic method by which the physical, mental, and vocational powers of the handicapped individual are improved to the point where he can compete, with equal opportunity, with the so-called 'non-handicapped'."

As the tempo of modern living has increased, more and more people have sustained serious and disabling injuries, and as our population continues to age, more and more older people are suffering from chronic illnesses. It will be the effort of your new rehabilitation center to take these people out of the back bedrooms and the homes for the incurables, to get them up from their beds of pain and away from long months of despair into active and dynamic programs which will help them back to self-sufficiency, self-respect, and happiness. Today, it is the responsibility of all health workers to go beyond the mere saving of lives and to make certain that the lives we have saved are not spent in seclusion and chronic invalidism, but rather, in pleasant social contact and in productive activity. Nowadays it is the responsibility of the physician "not only to add years to life, but also to add life to years."

Paraplegics

We physicians have learned a great deal about new ways of restoring seriously disabled people to a considerable degree of self-sufficiency. Prior to World War II, most persons who were paralyzed from the waist down after an injury of the spinal cord (paraplegics) were considered to be hopeless and, sad to relate, most of them were allowed to lie in bed, to acquire bed sores and, finally, to die. During and since World War II, rehabilitation units have discovered the importance of getting such people out of bed, improving their nutrition, training them how to walk on crutches and how to live with their disability. Today, the vast majority of such persons can be taught how to get around, how to drive a hand-operated automobile, and how to support themselves in some activity which does not require much walking.

In the Army of the United States the restoration of such patients was so effective that the Surgeon-General was led to say, "Until this program was instituted, men with spinal cord injuries and resulting paralysis were regarded as hopeless invalids and I fear they were treated as such. The attitude has been completely reversed. . . . To get the patient out of bed and on his feet was the goal in every paraplegic center for every man treated in it. We hitched our wagon to the stars and we got where we were going in a surprising number of cases."

Whereas some 265,000 men in the United States Army were disabled, as a result of combat injuries during World War II, 1,250,000 civilians were permanently disabled by accidents alone in the corresponding four years.

Chronic diseases

Likewise, in addition to these enormous numbers of injuries which frequently disable persons to a point at which they require extensive rehabilitation, medicine still lacks specific measures for the cure of many chronic diseases, and must look to rehabilitation centers like this one to teach the disabled

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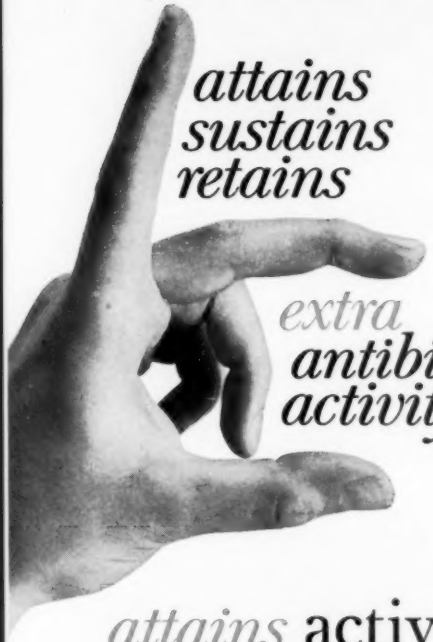

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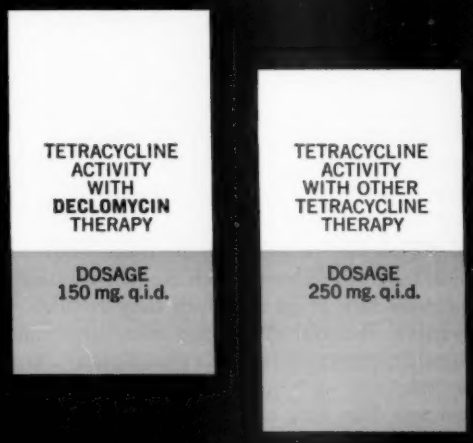

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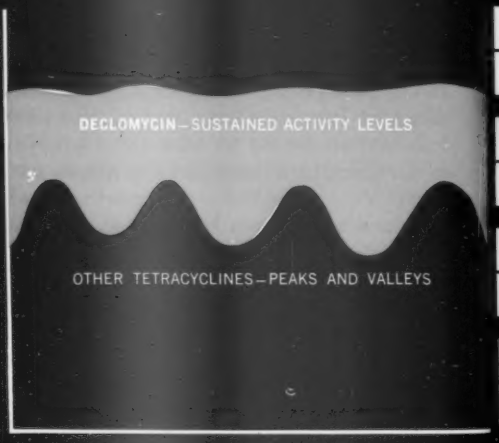

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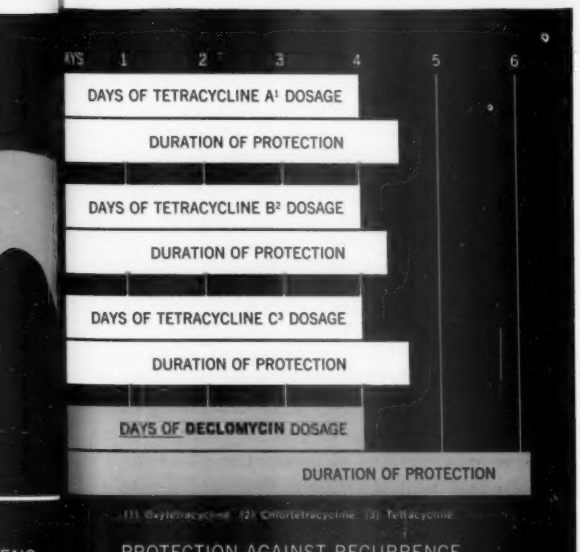

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people to live and to work as effectively as possible. Until such time as medicine finds the specific answers to the problems of the diseases of the heart and circulation, rheumatic fever and arthritis, cerebral palsy, multiple sclerosis and other similar crippling diseases, we must utilize the technics of physical rehabilitation, psychology, social service and the auxiliary specialties to teach the disabled persons to live within the limits of their disabilities, but to the full extent of their capabilities.

Those who help themselves

The medical services of any community cannot be considered to be complete until facilities are provided to train patients to live and to work with what they have left. What we need to do is to help the disabled to help themselves. It was Harold Russell, who starred in the motion picture, "The Best Years of Our Lives," and who had both his hands blown off in World War II, who said: "It is not what you have lost but what you have left that counts," and it was Major Alexander De Seversky, who lost a leg in World War I, who said: "I discovered early that the hardest thing to overcome is not a physical disability but the mental condition which it induces. The world, I've found, has a way of taking a man pretty much at his own rating. If he permits his loss to make him embarrassed and apologetic, he will draw embarrassment from others, but if he gains his own respect, the respect of those around him comes easily."

It is well for all of us to remember to take a handicapped person, as Major De Seversky says, at face value and to ignore his handicap. We should not be oversolicitous of the handicapped person.

The daughter of Bruce Barton (the famous publicist), Betsey Barton, who was paralyzed from the waist down after an automobile accident, describes the attitude of the seriously disabled person well in the following statement. She said: "Most of the things which hurt us in the indifferent, busy world will come from people who are in a hurry or who just don't notice that we are on crutches before they knock us down. They err to extremes, these busy ones: they either knock us down unintentionally or they rush to help us and so knock us down anyway. This is an odd thing. Every man, woman and child who is handicapped physically will pray for this each day when he gets up in the morning: not to be helped unless he asks for it."

Bernard M. Baruch, who has given so generously of his personal fortune for the rehabilitation of the handicapped, has said, "The investment in rehabilitation is an investment in the greatest and most valuable of our possessions, the conservation of human resources."

Wyoming's investment

The citizens of this state should continue cooperative efforts to advance the fine contribution of the outstanding group of citizens who have organized this rehabilitation center. Medicine has advanced beyond the point where it has concern merely for the saving of lives to the point at which it becomes evident that modern health workers should assist all chronically disabled persons to bridge the gap between the despair of being unemployed and the joy of having a useful occupation.

As we progress to new achievements in medical practice and community service, it is essential for us to transcend simply a concern for the saving of life and to battle for the closest possible approach to health and productivity for each disabled person, no matter how serious his illness may be, no matter how old he is, and no matter how severely he is handicapped.

You people who have supported the establishment of this great rehabilitation center have proved yourselves to be something more than go-getters. You are like the famous football coach, Knute Rockne. When Rockne was killed in an airplane accident in 1930, Father O'Donnell, in his funeral sermon, knowing how much Knute Rockne had given of himself to the young men he taught and how much he had done to train our youth in sportsmanship and in the finer qualities of character, said of Rockne: "In a world of go-getters, he was a go-giver." Like Rockne, you have proved yourselves to be go-givers.

The rehabilitation of your handicapped neighbors and fellow citizens presents a tre-

mendous challenge. The task is not an easy one, but if you can support the Gottsche Rehabilitation Center to the utmost, you and the other citizens of Wyoming will be repaid in enormous dividends of health, happiness, opportunity and productivity. It is my hope that you will join together unselfishly in assisting this new rehabilitation center to provide physical, mental, social and vocational rehabilitation, as well as employment, for literally thousands of your fellow citizens who are hoping against hope that you can bring them useful lives instead of hopeless ones.

"A niche of usefulness and self-respect exists for every man, however handicapped, but that niche must be found for him. To carry the process of restoration to a point short of this is to leave the cathedral without a spire. To restore him and with him the future of our country—that is the sacred work!" •

Chronic cor pulmonale*

A functional classification

Irving Mack, M.D., Chicago

The types of abnormality of lung structure, function and circulation determine the types of cor pulmonale. Pulmonary disease must be diffuse and bilateral.

CHRONIC COR PULMONALE may be defined as right ventricular hypertrophy resulting from disordered structure or function of the lung and/or the pulmonary circulation. Right ventricular failure need not be present. Excluded are such causes of right ventricular hypertrophy as left ventricular failure, acquired valvular heart disease, and congenital heart disease. Chronic cor pulmonale develops only when the pulmonary involvement is diffuse and bilateral rather than unilateral or focal. A classification of the causes of chronic cor pulmonale which correlates anatomic and functional abnormalities and also has therapeutic implications is here presented (see table): Type I—Pulmonary disease and dysfunction associated with chronic diffuse obstructive emphysema, Type II—Pulmonary disease or dysfunction with chronic alveolar hypoventilation, and Type III—Pulmonary disease in which the pathologic process or dysfunction is localized in or about the pulmonary vessels. Some cases will demonstrate features of more than one category. Therapy tends to be more satisfactory in Types I and II rather than in Type III because of the greater reversibility of the abnormalities in structure and function.

TABLE

Etiology of chronic cor pulmonale

I. Pulmonary disease with predominant chronic diffuse obstructive emphysema
   1. Chronic bronchitis
   2. Chronic pulmonary tuberculosis
   3. Bronchial asthma
   4. Fibrocystic disease of the pancreas
   5. Pneumonoconiosis
   6. Sarcoidosis
   7. Kyphoscoliosis

II. Chronic alveolar hypoventilation syndromes
   A. Defective chest bellows
      1. Massive bilateral pleural thickening

*From the Chest Department, Michael Reese Hospital, and the Department of Medicine, Chicago Medical School. Presented at the Silver Anniversary Homecoming Meeting of the American College of Chest Physicians, October 16, 1959, Albuquerque, N. M.

2. Chronic neuromuscular disorders
3. Kyphoscoliosis
4. Pickwickian syndrome

B. Disease of the medullary respiratory center

III. Pulmonary disease with predominant involvement of the vessels

A. Intraluminal processes
1. Multiple recurrent small pulmonary emboli
2. Thrombosis of major pulmonary arteries
3. Sickle cell anemia
4. Schistosomiasis
5. Primary pulmonary hypertension
6. Diffuse pulmonary vasculitis
7. Other causes of diffuse intravascular occlusion

B. Extraluminal processes
1. Sarcoidosis
2. Beryllium disease
3. Histiocytosis X
4. Hematogenous tuberculosis
5. Wegener's granulomatosis
6. Pneumonoconiosis
7. Collagen diseases
8. Diffuse interstitial pulmonary fibrosis
9. Idiopathic pulmonary hemosiderosis
10. Radiation fibrosis of lungs
11. Diffuse interstitial fibrosis caused by chronic obstruction of the pulmonary veins
12. Polycystic disease of the lungs
13. Metastatic carcinomatosis of lung
14. Other diffuse interstitial infiltrations of the lung
15. Extrinsic compression of main pulmonary arteries

IV. Combinations of Types I through III

Type I: Pulmonary disease with predominant chronic obstructive emphysema

Chronic diffuse obstructive emphysema is the commonest cause of chronic cor pulmonale in this country. The commonest cause of chronic obstructive emphysema is chronic bronchitis and bronchiolitis. However, chronic diffuse obstructive emphysema also frequently develops in other pulmonary diseases where it plays the major role in causing chronic cor pulmonale. Chronic cor pulmonale may therefore develop when chronic diffuse obstructive emphysema becomes severe in chronic pulmonary tuberculosis, chronic bronchial asthma with associated chronic bronchitis, fibrocystic disease of the pancreas, and certain pneumonoconioses (silicosis, anthrosilicosis, bauxite pneumonoconiosis, and diatomite pneumonoconiosis). In diffuse pulmonary sarcoidosis where the granulomata are predominantly peribronchiolar and endobronchial, diffuse airway obstruction leads to severe obstructive emphysema. Where the granulomata are located predominantly interstitially and in the interalveolar septa, Type III chronic cor pulmonale develops and will be discussed below. While the primary abnormality in severe kyphoscoliosis is chronic alveolar hypoventilation (Type II, see below), these patients suffer from recurrent and lingering bronchopulmonary infections; diffuse obstructive emphysema then results and contributes to the development of chronic cor pulmonale.

Hypertrophy of the right ventricle in chronic diffuse obstructive emphysema develops because of its increased work. This increased right ventricular load results from an increased resistance to pulmonary blood flow and, when present, an increased cardiac output. Increased resistance to pulmonary blood flow in chronic diffuse obstructive emphysema is caused by: (1) a reduction in the cross sectional diameter and the distensibility of the pulmonary vascular bed, (2) hypoxia, (3) increased blood viscosity if polycythemia has developed, and (4) possibly certain functional consequences of an expansion of intrapulmonary vascular shunts, particularly between the bronchial arteries and pulmonary arteries and between the bronchopulmonary veins and pulmonary veins. Hypoxia is especially important in increasing the resistance to pulmonary blood flow, not only because it produces pulmonary arteriolar constriction, but also because it causes secondary polycythemia. Hypoxia results mainly from the marked impairment of distribution of inspired air to mixed venous blood (defective intrapulmonary mixing). This distribution defect follows from the combination of a large functional residual capacity, a widespread but irregular loss of pulmonary elasticity, and diffuse bronchiolar obstruction. An increased cardiac output is a result of hypoxia, hypervolemia if polycythemia is present, activity of the inflammatory process in the lung, and the increased musclar work of breathing.

The treatment of chronic cor pulmonale

due to diffuse obstructive emphysema will be effective only if one succeeds in at least partially reversing many of the pathologic changes which led to the development of the hypoxia as well as the anatomic reduction of the pulmonary vascular bed. Intensive therapy of the bronchopulmonary disease will therefore be as important as specific cardiac measures. Every attempt should be made to combat infection, reduce the diffuse airway obstruction, and improve effective alveolar ventilation. Oxygen therapy may often be necessary, but should be used with caution because of the insensitivity of the respiratory center to the carbon dioxide stimulus. Oxygen may then be given in lower concentrations, intermittently, or with mechanical respiratory aids.

Type II: Chronic alveolar hypoventilation syndromes

Chronic alveolar hypoventilation when of sufficient severity and duration leads to hypoxemia, hypercapnia, polycythemia, pulmonary hypertension, right ventricular hypertrophy, and failure. Such severe chronic alveolar hypoventilation syndromes may be divided into two groups: (1) conditions associated with poor functioning of the chest bellows and (2) primary disease or insensitivity of the respiratory center. Among the conditions in which a defective chest bellows has led to alveolar hypoventilation, severe and chronic enough to cause chronic cor pulmonale, are: (a) massive bilateral pleural thickening, (b) such chronic neuromuscular disorders as severe residual respiratory paralysis following poliomyelitis, the muscular dystrophies, myasthenia gravis, and amyotrophic lateral sclerosis, (c) kyphoscoliosis, and (d) the cardiopulmonary syndrome associated with obesity (Pickwickian syndrome). In kyphoscoliosis the deformity may often be severe enough to cause not only alveolar hypoventilation but also anatomic restriction of the pulmonary vascular bed. In addition, because the severe chest deformity interferes with cough efficiency, the accumulated effect of repeated bronchopulmonary infections may lead to a complicating diffuse obstructive emphysema which will contribute importantly to the development of chronic cor pulmonale. Patients have been described who demonstrate alveolar hypoventilation but who have normal chest bellows and normal lungs. They suffer from a diminished ventilatory drive from a damaged respiratory center and demonstrate a poor ventilatory response to exercise and inspired carbon dioxide. They develop hypoxemia, hypercapnia, secondary polycythemia, right ventricular hyptertrophy and eventually failure.

Therapy of the chronic alveolar hypoventilation syndromes with chronic cor pulmonale and congestive failure will be successful only if alveolar ventilation is improved. Where the pulmonary insufficiency and congestive heart failure have been precipitated by an acute respiratory infection, intensive treatment of the respiratory infection is necessary. Frequently the use of a mechanical respiratory aid to assist or substitute for the patient's own chest bellows becomes necessary to improve the alveolar ventilation, diminish the work of breathing, and relieve the hypoxemia and hypercapnia.

Type III: Pulmonary disease with predominant involvement of the vessels

Vascular and intravascular processes include multiple repeated small pulmonary emboli, thrombosis of major pulmonary arteries, sickle cell anemia with multiple pulmonary arterial and arteriolar thromboses, schistosomiasis with pulmonary obliterating endarteritis, primary pulmonary hypertension, and diffuse pulmonary vasculitis. Among the perivascular processes are included conditions with extensive and diffuse infiltration of the interstitial tissues of the lung: sarcoidosis, beryllium disease, histiocytosis X, hematogenous tuberculosis, Wegener's granulomatosis, collagen diseases, diffuse interstitial pulmonary fibrosis (Hamman-Rich syndrome), idiopathic pulmonary hemosiderosis, radiation fibrosis of lungs, diffuse interstitial fibrosis caused by chronic obstruction of the pulmonary veins, polycystic disease of the lungs, severe asbestosis, some cases of silicosis where the silicotic nodules are predominantly perivascular, metastatic carcinomatosis of the lung (endolymphatic carcinomatosis often associated

with tumor emboli as well as blood clot emboli), and extrinsic compression of the main pulmonary arteries by an aortic aneurysm or neoplastic lymph nodes.

In these conditions the main cause of the pulmonary hypertension and the chronic cor pulmonale is the great reduction in the pulmonary vascular bed. Cardiac output tends to be low, especially with exercise, except in the group with interstitial inflammatory infiltration. Therapy in this group tends to be less satisfactory than in the previous two groups. Marked restriction of the physical activity in these patients may be one of the few measures available to reduce the load on the right ventricle, because of the permanent anatomic restriction of the pulmonary vascular bed. Patients with multiple recurrent small pulmonary emboli, thrombosis of major pulmonary arteries, or primary pulmonary hypertension should probably be on interminable anticoagulant therapy. Where the interstitial infiltration will respond to specific medication such as the adrenal corticosteroids, these should be employed (sarcoidosis, beryllium disease, vasculitis, collagen disease, diffuse interstitial fibrosis). It is frequently impossible, however, to predict whether resolution or fibrosis will occur. Associated bronchopulmonary infection and diffuse obstructive emphysema when present should be treated intensively. Oxygen in high concentration may be given to these patients, there usually being no danger of respiratory depression as might occur in chronic diffuse obstructive emphysema or the chronic alveolar hypoventilation syndromes.

Combinations of Type I through Type III

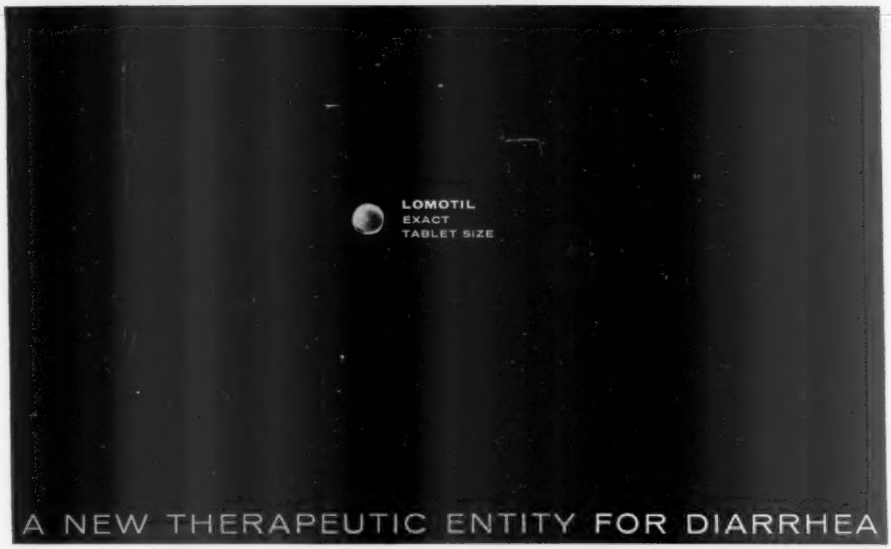
In many instances structural and functional abnormalities of more than one category may coexist in a patient, contributing to the development of chronic cor pulmonale. For example, in sarcoidosis even when the involvement tends to be localized primarily about the pulmonary vessels, there may be sufficient peribronchiolar granulomatous infiltration to have produced a significant degree of diffuse obstructive emphysema. However, examples where the involvement is almost exclusively one or the other type have been reported. In silicosis too, while predominant vascular involvement is important, the complicating diffuse obstructive emphysema is often the major reason for the development of chronic cor pulmonale. In some cases of severe kyphoscoliosis, we see functional abnormalities pertinent to all three categories existing. For example, a case of severe kyphoscoliosis may show some anatomic reduction of the pulmonary vascular bed particularly in areas where there is compression of the lung, alveolar hypoventilation due to marked restriction of the chest bellows, and areas of diffuse airway obstruction with chronic obstructive emphysema.

In patients with chronic pulmonary disease and a markedly restricted pulmonary vascular bed, the abrupt development of some pulmonary catastrophe such as extensive pneumonitis, or massive collapse of a lung which produces a critical increase in the pulmonary vascular resistance may cause a rapid dilatation of the right ventricle associated with myocardial ischemia and death. The clinical picture, the electrocardiographic changes, and the pathologic findings will be those of acute cor pulmonale, although no pulmonary embolization has occurred.

Summary

Chronic cor pulmonale may be defined as right ventricular hypertrophy resulting from disordered structure or function of the lung and/or the pulmonary circulation; right ventricular failure need not be present. Chronic cor pulmonale develops only when the pulmonary disease is bilateral and diffuse. The following functional classification of the etiology of chronic cor pulmonale has been presented: Type I—pulmonary disease and dysfunction associated with chronic diffuse obstructive emphysema, Type II—pulmonary disease or dysfunction with chronic alveolar hypoventilation syndrome, and Type III—pulmonary disease in which the pathologic process and dysfunction is localized in or about the pulmonary vessels. Combinations of I through III may also exist. It has been demonstrated that the effectiveness of therapy will largely depend on the cause of the chronic cor pulmonale. Therapy tends to be more successful where the pathologic abnormalities and functional aberrations leading to the development of chronic cor pulmonale are largely reversible, as in Types I and II. ●

references on page 65



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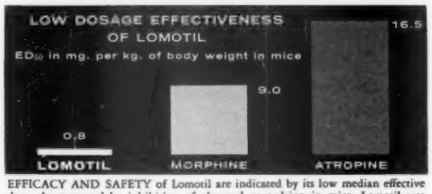

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Research in the Service of Medicine

Editorials cont. from page 32

press such deep convictions but I am sure we still have them in our hearts. Otherwise, we could not have a proper regard for our own reputations or those that have been earned by people we know, whether they are in private life, in business or even in politics.

"In this country, the right to earn a good living and acquire an honorable reputation includes the right to protect not only your property but your good name—and that goes for every reputable business concern as well as private citizens.

"The only difference is that any business reputation becomes much more widely known than that of any one individual, and therefore imposes upon that business a much greater responsibility for reliable conduct. The well earned reputations of good business firms, large or small, are worth much more to them than their stores or factories. They can rebuild almost anything but a reputation.

"All of this means that the good reputation of any individual, family or business is worth whatever it takes to protect and maintain it."

Dear Doctor Kindly Heart:

Dear Dr. Kindly Heart:

By some sinister movement our hospital was "duped" into setting up our staff to get accreditation from some crazy hospital organization. One of the new things was a "tissue committee" that snoops into our surgical cases.

Two young "whippersnappers" got on this committee and last week they talked the other doctors into questioning some of my surgery. Mind you, they had the temerity to ask me why I had done some 70-odd uterine suspensions last year.

I am writing you so you can publish this and let other doctors know what shocking things can happen when inexperienced young tinhorn doctors are allowed to criticize their ethical colleagues.

Signed: "Shocked"

Answer:

Dear "Shocked":

I don't know exactly how current you are in your medical reading, but I suspect I have a shock for you: John J. Murphy is no longer operating and our beloved President Grover Cleveland has passed away.

♥

Dear Dr. Kindly Heart:

Do you have information as to some substance that will mask the odor of alcohol?

I have found it very relaxing to have a drink or two at lunch and a few cocktails before dinner. After evening rounds, I often relax at home with a few highballs before retiring. These few drinks seem to stimulate me mentally. Of course, there are some prudes who disapprove of a few "social" cocktails but I have been quite successful in hiding the odor of liquor. I have used gum, candy, sensen, tobacco, etc., but I wonder if there is some new method of disguising the odor of whiskey.

Sincerely, Dr. "Social Drinker"

Answer:

Dear Dr. "Social Drinker":

Try holding your breath — for about fifteen minutes.

♥

Dear Dr. Kindly Heart:

I am a troubled psychiatrist. My problem is that recently many of my colleagues have started kidding me about taking care of "crazy people." They pull such terrible jokes as asking "how's the nut-cracking business," etc.

If that wasn't bad enough, they are laughing behind my back and it seems that even the hos-

pital and office nurses are "snickering" when I pass by.

What would you suggest?

Sincerely: "Troubled Psychiatrist"

Answer:

Dear "Troubled Psychiatrist":

Either see a psychiatrist, have your teeth cleaned, or use another under-arm deodorant.

♥

Dear Dr. Kindly Heart:

I am an office nurse and read your letters in the Medical Journal. I believe I work for the Dr. "Tempted" who wrote you about the beautiful blonde patient who was making repeated "advances" to him in the form of telephone calls, phony sick calls, etc. He indicated he was trying to discourage her but was "tempted."

Perhaps the story he told is true, but there are a few facts that might shed additional light on his dilemma. First of all, he never charges her although he spends quite a long time with her at each visit. Then, he always tells her to come back even though, as he says, she is quite a healthy and vigorous specimen. Also, he never leaves his number when he goes "there" on a call.

I wonder if there is anything more I can do to help? Signed: "Helpful Office Nurse"

Answer:

Dear "Helpful Office Nurse":

You have been more than helpful. Perhaps now I can give you a little helpful advice. After you read this, do one of two things: either make sure, come hell or high water, that your doctor employer never sees this letter or start looking for another job.

♥

Dear Dr. Kindly Heart:

Recently the Nevada State Medical Association became affiliated with our grand publication, The Rocky Mountain Medical Journal. As I understand it, these good doctors will also be a part of the Rocky Mountain Medical Conference.

The matter that bothers me is this: sooner or later, Nevada will host the Rocky Mountain Medical Conference and I assume the meeting will be held in either Las Vegas or Reno.

Should we stand idly by and allow our colleagues to attend a meeting in these "cities of sin"? For my part, the members of the honorable profession of medicine should not be exposed to gambling, night shows, intoxicating beverages and a "loose" way of life. We have much at stake here: the morality of our profession is in mortal danger.

Through what channels should I proceed to bring these dangers into the open?

Yours truly, Dr. "Guardian"

Answer:

Dear Dr. "Guardian":

Go see the Chaplain.

Chronic cor pulmonale cont. from page 62

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in infectious disease[17,22,30,36]
in arthritis[18,19,20,29]
in hepatic disease[2,3,4,5,38]
in malabsorption syndrome[1,2,6,37]
in degenerative disease[6,7,19,20,40]
in cardiac disease[23,28,29,38,41]
in dermatitis[24,39]
in peptic ulcer[8,21,26]
in neuroses & psychiatric disorders[25,28]
in diabetes mellitus[31,32,33,34]
in alcoholism[9,11,35,37,39]
in ulcerative colitis[10,14,16]
in osteoporosis[12,13,27]
in pancreatitis[15]
in female climacteric[12,24]

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1-41 a list of the above references will be supplied on request.

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Actual case summary from the files of Bristol Laboratories' Medical Department

THE WASHINGTON SCENE

A monthly news summary from the nation's capital by the Washington Office of the A.M.A.

The federal government is offering states liberal matching funds to provide health care for needy and near-needy persons 65 years of age and older.

The program, which Congress approved in the bob-tailed postconvention session, is supported by the American Medical Association and allied health groups.

Congressional approval of the federal-state program marked a victory for the medical profession and a defeat for Democratic Presidential Nominee John F. Kennedy, the AFL-CIO and other advocates of the Social Security approach to the problem.

In a key vote on the issue, the Senate rejected by a 51-44 vote a Kennedy proposal that would have provided hospitalization and medical care for the aged under the Social Security system. The Kennedy plan would have required an increase in pay roll taxes.

Republicans and Southern Democrats joined in the Senate to defeat the Social Security approach which was opposed vigorously by the medical profession.

After voting down the Kennedy plan and a separate proposal of the Eisenhower Administration, the Senate passed a modified version of a House-approved program. The modifications, sponsored by Sen. Robert S. Kerr (D., Okla.) and others, provided for increases in the percentage of federal matching funds and for administrative changes designed to facilitate state participation.

Under the legislation as signed into law by President Eisenhower, (1) substantial increases are authorized in federal grants to states to help with health care expenses of the 2.4 million persons on old age assistance rolls, and

(2) Federal matching funds are offered the states to finance a new program of health care for an estimated 10 million aged persons who are not on relief but whose incomes may be inadequate to take care of all their health costs.

Start of the program was authorized for October 1 for those states where new state legislation is not required.

Administration of the program rests entirely with the states, subject to federal approval in broad terms. It is up to each individual state whether it participates. Eligibility standards for

beneficiaries and what health care services are provided are matters for the states to decide.

If a state so chooses, it can take care of all the health needs of an eligible beneficiary. The law authorized in-patient hospital services; skilled nursing home services; physicians' services; outpatient or clinic services; home care services; private duty nursing services; physical therapy and related services; dental services; laboratory and x-ray services; prescribed drugs, eyeglasses, dentures and prosthetic devices; diagnostic screening and preventive services, and any other medical care or remedial care recognized under state law.

For medical expenses of persons on old age assistance rolls, the federal government will contribute 50 to 80 per cent—with states with low per capita income getting the larger percentages of federal aid—of an amount equal to $12 multiplied by the number of old age assistance recipients in a particular state.

The matching formula will be the same for financing the health care of the near-needy but there is no $12 limitation figure.

Health, Education and Welfare officials estimated first-year costs of the program at $262 million—$202 million federal and $60 million state. Annual costs are estimated to rise by the end of the fifth year to $340 million federal and $180 million state. However, these estimates admittedly are no more than educated guesstimates because so much depends upon state action.

It was estimated that maximum participation and a state contribution of $314,000 would bring Colorado $4 million in federal matching funds in the first year of the program.

The medical-care-for-the-aged legislation was included in an omnibus measure titled Social Security Amendments of 1960. It also eliminated the age 50 requirement for eligibility for disability insurance benefits.

The Senate knocked out of the House bill a provision that would have brought physicians under Social Security coverage.

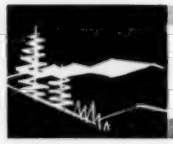
On other legislation of interest to the medical profession:

Congress passed bills authorizing expenditure of $10 million of counterpart funds abroad to stimulate international research; authorizing up to 15 per cent of National Institutes of Health research grants for nongovernmental medical research; directing a broad study of air pollution problems; requiring informative labeling on packages of hazardous substances for household use, and giving the government power to establish a tolerance on the amount of color additives that may be used in various products.

The Senate failed to act upon the House-approved legislation that would have given physicians and other self-employed persons a tax break on income put into private pension plans.

by his colleagues. He was one of the last vestiges of a past medical era which shone in Colorado Springs with its own legitimate luster."

Dr. McCrossin is survived by his wife and a daughter.



COLORADO

Obituary

Founder of Penrose Cancer Hospital passes away

William Patrick McCrossin, M.D., died in Colorado Springs on July 7, 1960. Dr. McCrossin was born in Birmingham, Alabama, on February 14, 1890, and attended the University of Alabama. He received his M.D. degree from Tulane University in 1916 and served an internship at Hillman Hospital in Birmingham. He was a resident at Women's Hospital in New York City and became attending surgeon at Hillman Hospital, attending gynecologist at St. Vincent's Hospital and attending surgeon at Children's Hospital in Birmingham.

During the war, Dr. McCrossin served as a Captain in the Medical Corps of the A.E.F. in charge of the operating room at the evacuation hospital in Verdun.

Dr. McCrossin came to Colorado Springs in 1921 and was licensed in Colorado the same year. First he served as consultant in surgery at Cragmor Sanatorium and for the Memorial Research Foundation for Tuberculosis. Later he became an active staff member of the three Colorado Springs hospitals, becoming chief of staff at the former Glockner Hospital for two terms. It was largely through Dr. McCrossin that the late Spencer Penrose established the Penrose Cancer Clinic, a part of the Glockner Hospital, and that the present new building came to be built, the whole institution now being named the Penrose Hospital.

Dr. McCrossin was a member of the Research Foundation for Tuberculosis, the El Paso County Medical Society, and the American College of Surgeons. He was a member of Alpha Tau Omega, Phi Chi, Alpha Omega Alpha, Stars and Bars Club, Cheyenne Mountain Country Club, the Cooking Club of Broadmoor, and the Boston Club of New Orleans.

Everyone will say wonderful things of Dr. McCrossin, but the words of Dr. Juan A. del Regato, Director of the Penrose Cancer Clinic, seem most apropos. "In Dr. McCrossin," says Dr. del Regato, "we have lost the beloved, honorary chief of our staff and one of the strongest pillars of our organization. A reserved, impeccable Southern gentleman, a compassionate physician, he was beloved by his patients and respected

MONTANA

Obituary

R. H. DYER

Royal Homer Dyer, M.D., died at his home in Sheridan, Montana, on August 16, 1960. Dr. Dyer was born May 24, 1882, at Malta Bend, Missouri. He received his A.B. degree from Missouri University in 1905 and his M.D. degree from the St. Louis School of Medicine in 1907.

Dr. Dyer moved to Sheridan for the general practice of medicine in 1911. He continued his practice in this community until his death. Dr. Dyer served three terms as Mayor of Sheridan and served as the Public Health Officer of Madison County for 40 years.

The officers and members of this Association extend their sincere sympathy to the family and friends of Dr. Dyer.

WYOMING

Wyoming doctor named head of research and nutrition labs at Fitzsimons General Hospital

Lt. Col. Marion E. McDowell, MC, has been named commander of the United States Army Medical Research and Nutrition Laboratory at Fitzsimons General Hospital. He succeeds Lt. Col. Irvin C. Plough, MC, whose next assignment will be in the Caribbean Command.

Colonel McDowell, son of Mr. and Mrs. George E. McDowell, 2935 East B Street, Torrington, Wyo., is a 1938 graduate of Torrington High School. He received his B.S. degree from the University of Wyoming in 1942 and his medical degree from the University of Rochester Medical School in 1945. He interned at the same medical school and Strong Memorial Hospital.

Obituary

WINIFRED INGERSOLL

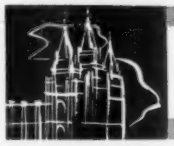
Dr. Winifred Ingersoll, 70, University of Wyoming physician from 1940 to 1958, died Sunday,

July 31, in the Ivinson Memorial Hospital at Laramie.

Born February 14, 1890, in South Dayton, New York, Dr. Ingersoll received her M.D. degree from Wisconsin University in 1936. Both her internship and residency were served at the Wisconsin General Hospital in Madison.

While serving as University of Wyoming physician, she was named Acting Director of the Student Health Service in 1944-45, 1947-48, and 1954-55. Upon her retirement, July 1, 1958, she was placed on limited service by the University's Board of Trustees.

She is survived by a sister, Miss Mildred Ingersoll of Laramie and Tempe, Arizona.



UTAH

Wyeth pediatric fellowship awarded to Dr. Robins

M. Moreno Robins, M.D., 50 West 1100 Street, Bountiful, Utah, has been awarded a Wyeth Laboratories pediatric residency fellowship.

Dr. Robins will take his residency at the University of Washington Affiliated Hospitals, Seattle, where he recently completed his internship. The fellowship recipient received his B.A. and M.D. degrees from the University of Utah, where he was elected to Phi Beta Kappa.

The pediatric program, sponsored by the Wyeth Fund for Postgraduate Medical Education, provides a grant of $4,800 to Dr. Robins, thus enabling him to spend two years of advanced study in the care and treatment of children.

Obituaries

WALLACE H. BUDGE

A heart attack claimed the life of Wallace Hugh Budge, M.D., at his home in Ogden last month.

The well-known physician and surgeon, who was born in Paris, Idaho, in 1889, received his M.D. degree from Rush Medical College in Chicago. He began medical practice in Logan in 1920, moving to Ogden in 1925.

Dr. Budge was a charter member of the Ogden Surgical Society, as well as a member of the Weber County Medical Society. He was also affiliated with Nu Sigma Nu, medical fraternity.

Among his survivors are his widow and Drs. O. H. Budge and S. M. Budge of Logan.

WILLIAM R. CALDERWOOD

A founder and the first President of the Utah Mental Hygiene Association, now the Utah Association for Mental Health, died last month in Salt Lake City at the age of 94. William R. Calderwood, M.D., had retired seven years ago as medical director of Beneficial Life Insurance Company. Prior to serving in this position, Dr. Calderwood practiced medicine in Salt Lake City, and taught physical diagnosis at the University of Utah College of Medicine.

He was a President of both the Salt Lake County Medical Society and the Utah State Medical Association. His medical education was through Rush Medical College in Chicago, where he received his M.D. degree in 1902.

Dr. Calderwood is survived by two daughters, Mrs. Robert W. (Dr. Edna) Thayer, of Greensboro, N. C., and Mrs. David L. McKay, of Salt Lake City, as well as nine grandchildren, 14 great-grandchildren, three brothers, and three sisters.

BLUE CROSS BLUE SHIELD

Blue Shield and the longer view

Like a somewhat wayward child, Blue Shield often plays the role of favorite whipping boy for the doctors who created it. Wherever several physicians are gathered together—in staff room, committee meeting or on the second tee—someone is certain to take out after the local Blue Shield Plan.

When the definitive history of prepayment is written, perhaps one may trace a falling rate of divorce among American physicians who have worked out so many of their frustrations, not on their wives, but on their Blue Shield Plans.

Some Blue Shield administrators confess to a wry satisfaction in all this—recognizing that a parent is always fussier with his own offspring than with a child for whom he has no emotional affinity.

Blue Shield is a vast community umbrella designed to ward off the rain of medical adversity which falleth alike upon the just and the unjust. It serves the need of the average man as best it may, but it sometimes falls a little short of the special needs or wishes of the individual patient and his doctor.

In these parlous times, when the Forand philosophy seems to have so thoroughly infected the politicians of both parties, American medicine has reasons more apparent than ever before to honor those medical pioneers who built Blue Shield, and to support the civic and professional leaders who today are working so hard to make Blue Shield an ever more effective instrument.

None can doubt that without the reality of a strong and growing Blue Shield movement during the 1950's, America would long since have had universal compulsory health insurance. And few

today would dispute the proposition that if American medicine escapes the thralldom of state medicine during the 60's, it will have the voluntary prepayment movement—chiefly Blue Shield—to thank for its good fortune.

Let's all keep a closer eye on Blue Shield—not merely to discern the motes in its eye—but to encourage it to do the best job it can do for us and for the American people.

NATIONAL AFFAIRS

Review of the Harrison Narcotic Law

F. C. Hammerness, Ph.D.*

The following information pertains to the latest revision of the Harrison Narcotic Law as printed in the IRS Publication No. 428 (6-59) and commonly known as Regulations No. 5.

Prescriptions for narcotic drugs must be written in ink bearing the name and address of the patient; name, address and registry number of the prescriber; date of issue; and the signature of the prescriber.

Narcotic drugs have been classified as follows:

Class A—Fully controlled narcotic drugs requiring a signed prescription. This class *cannot be phoned in* and signed at a later date.

Class B—Those narcotic drugs for which the pharmacist may accept a physician's oral or telephoned prescription.

Class X—Exempted preparations which may be sold by the pharmacist without prescription upon entry in the exempt narcotic register.

Class A products—*All* narcotic drugs which are in the pure form whether they are in the form of tablets, capsules, powders and solutions. A partial list of the more common Class A narcotic drugs: Amidone, cocaine, codeine, demerol, dilaudid, dolophine, dromoran, methadone, morphine and pantopon.

Class B products—These are narcotic drugs which can be given orally or telephoned if they are compounded with another medicinally active non-narcotic drug.

Oral narcotics list:

1. Isoquinoline alkaloids of opium; papaverine, narcotine, cotarnine and narceine.
2. Apomorphine.
3. Nalline.
4. Codeine—A.P.C. c codeine, empirin compound c codeine, etc. Copavin.
5. Dihydrocodeinone, dicodid, hycodan.
6. Ethylmorphine, dionin.
7. Dihydrohydroxycodeinone, eucodal.

In the event you are not sure, call your pharmacist for the needed information.

Note: 1. Prescriptions for Class A or Class B narcotic drugs CANNOT be refilled. A new prescription for the Class A is required each time and a new order must be given orally or telephoned for the Class B narcotic drug.

2. Physicians CANNOT acquire narcotic drugs for office use in their practice except by filling out a narcotic order form (NOT a prescription). The quantities are not to exceed ONE fluid ounce at any one time and the quantity of narcotic is not to exceed 20 per cent of the completed solution. It is important to note that the narcotic drug must be in an aqueous or oleaginous solution.

Colorado exceptions to the Federal Law

1. Paregoric is NOT an exempt narcotic in Colorado and it is NOT a Class B, but a Class A narcotic drug and must be dispensed *only* upon receipt of a properly written and signed prescription. It CANNOT be telephoned.

2. Codeine in the amounts of 1 grain per fluid ounce and dihydrocodeinone in the amounts of 1/6 grain per fluid ounce are the ONLY EXEMPT preparations allowed in the State of Colorado. The maximum that can be dispensed in any given 48-hour period is 4 grains of codeine and 2/3 grain of dihydrocodeinone.

*Associate Professor, School of Pharmacy, University of Colorado.

Junior volunteers in V.A. hospitals

Teen-age girls across the nation received a first-hand look at nursing as a career by serving as junior volunteers in Veterans Administration hospitals this summer.

The VA offered them plenty to observe and do. The agency's system of 170 general medical and surgical, psychiatric, and tuberculosis hospitals operates the world's largest organized nursing service and assists in providing clinical experience to one of each ten professional nurses being produced by the country.

Indications are the junior program has succeeded in interesting a substantial number of young people in careers in the medical and related-medical fields where personnel shortages exist for both private and government hospitals.

1,928 published cases in the two years since TAO was released for general use show:

94.3% effectiveness in respiratory infections (617 cases including tonsillitis, staphylococcal and streptococcal pharyngitis, bronchitis, infectious asthma, broncho-pneumonia, lobar pneumonia, bronchiectasis, lung abscess, otitis.) **You can count on TAO.**

92% effectiveness in skin and soft tissue infections (900 cases including pyoderma, impetigo, acne, infected skin disorders, wounds, incisions and burns, furunculosis, abscess, cellulitis, chronic ulcer, adenitis.) **You can count on TAO.**

87.1% effectiveness in genitourinary infections (349 cases including urethritis, cystitis, pyelitis, pyelonephritis, orchitis, pelvic inflammation, acute gonococcal urethritis, lymphogranuloma venereum.) **You can count on TAO.**

75.8% effectiveness in diverse infections (62 cases including fever of undetermined origin, peritoneal abscess, osteitis, periarthritis, septic arthritis, staphylococcal enterocolitis, gastroenteritis, carriers of staphylococci.) **You can count on TAO.**

95.6% of 1,928 cases free of side effects—in the remaining 4.4%, reactions were chiefly mild gastrointestinal disturbances which seldom necessitated discontinuance of therapy.

* In 884 of 1,928 cases the causative organisms were mostly staphylococci. The majority of clinical isolates were found to be resistant to at least one of the commonly used antibiotics and many patients had failed to respond to previous therapy with one or more antibiotics. **TAO proved 93.4% effective in these 884 cases.**

Complete bibliography available on request.

DOSAGE: varies according to severity of infection. Usual adult dose—250 to 500 mg. q.i.d. Usual pediatric dose: 3-5 mg./lb. body weight every 6 hours.

NOTE: In some children, when TAO was administered at considerably higher than therapeutic levels for extended periods, transient-jaundice and other indications of liver dysfunction have been noted. A rapid and complete return to normal occurred when TAO was withdrawn.

SUPPLY: TAO CAPSULES—250 mg. and 125 mg., bottles of 60. TAO ORAL SUSPENSION—125 mg. per 5 cc. when reconstituted, palatable cherry flavor, 60 cc. bottles. TAO PEDIATRIC DROPS—100 mg. per cc. when reconstituted, flavorful; special calibrated dropper, 10 cc. bottles. INTRAMUSCULAR or INTRAVENOUS—10 cc. vials, as oleandomycin phosphate.

OTHER TAO FORMULATIONS ALSO AVAILABLE: TAO®-AC (Tao, analgesic, antihistaminic compound) capsules, bottles of 36. TAOMID® (Tao with Triple Sulfas)—tablets, bottles of 60. Oral Suspension—60 cc. bottles.

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ROERIG Rx

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Science for the World's Well-Being™

To the relief of musculoskeletal pain, new MEDAPRIN* adds restoration of function

Analgesics offer temporary relief of musculoskeletal pain, but they merely *mask* pain rather than getting at its *cause*. New Medaprin, in addition to bringing about prompt subjective improvement, promotes the *restoration of normal function* by suppressing the inflammation that *causes* the pain.

Medaprin, Upjohn's new analgesic-steroid combination, contains aspirin plus Medrol,** the corticosteroid with *the best therapeutic ratio in the steroid field.*† Instead of suffering recurrent discomfort because of the "wearing off" of analgesics, the patient on Medaprin experiences a smooth, *extended* relief and more normal mobility.

Indications: Medaprin is indicated in mild-to-moderate rheumatic and musculoskeletal conditions, including rheumatoid arthritis, deltoid bursitis, low back pain, neuralgia, synovitis, fibromyositis, osteoarthritis, low back sprain, traumatic wrist, sciatica, and "tennis elbow."

Dosage: The recommended dosage is 1 tablet q.i.d. The usual cautions and contraindications of corticotherapy should be observed.

Supplied: In bottles of 100 and 500.

Formula: Each Medaprin tablet contains

- 300 mg. acetylsalicylic acid, for prompt relief of pain
- 1 mg. Medrol, to suppress the causative inflammation
- 200 mg. calcium carbonate, as buffer

*TRADEMARK **TRADEMARK, REG. U. S. PAT. OFF.—METHYLPREDNISOLONE, UPJOHN
†RATIO OF DESIRED EFFECTS TO UNDESIRED EFFECTS

The Upjohn Company, Kalamazoo, Michigan

Upjohn

Diabetes Week—November 13-19

Diabetes Week has been set this year for November 13-19, according to Joseph H. Crampton, M.D., Chairman of the American Diabetes Association's Committee on Public Education and Detection.

The diabetes detection program is an excellent public relations project for state and county medical societies.

To help local authorized programs, reagents (Clinitest and Sugar Test Denco) are again being made available free of charge, and testing strips (Dreypaks) may be secured at cost. Both Clinitest and Sugar Test Denco (formerly Galatest) are made available, without charge, through the courtesy of the respective manufacturers.

American Board of Obstetrics and Gynecology

The next scheduled examination (Part 1), written, will be held in various cities of the United States, Canada, and military centers outside the Continental United States, on Friday, January 13, 1961. Reopened candidates are required to submit case reports for review 30 days after notification of eligibility. Scheduled Part 1 and candidates resubmitting case reports are required to submit case reports prior to August 1st each year. Current bulletins may be obtained by writing to: Robert L. Faulkner, M.D., Executive Secretary and Treasurer, 2105 Adelbert Road, Cleveland 6, Ohio.

Physician heal thyself

A tabulation of the results of the physical examinations given to physicians attending the A.M.A. meeting in Miami, Florida, reveal that 20 per cent of those examined had heart abnormalities, 14 per cent had chest abnormalities, including evidence of old tuberculosis, as shown in x-rays, and 5 per cent were suffering from eye-strain. Commenting on the percentage of heart abnormalities, a spokesman for the examiners said this was twice the average for the general population, and recommended doctors follow their own advice to exercise more.

THE BOOK CORNER

New books received

New books received are acknowledged in this section. From these, selections will be made for reviews in the interests of the readers. Books here listed will be available for lending from the Denver Medical Library soon after publication.

Edema; mechanisms and management. A Hahnemann Symposium on salt and water retention: By J. H. Moyer, M.D., and Morton Fuchs, M.D., eds. Philadelphia, W. B. Saunders Co., 1960. 833 p. Price: $15.00.

Medical, surgical and gynecological complications of pregnancy (by the staff of the Mt. Sinai Hospital, New York): By Alan F. Guttmacher, M.D., and Joseph J. Rorinsky, M.D., eds. Baltimore, Williams and Wilkins, 1960. 619 p. Price: $16.50.

Fundamentals of Hematology: By Byrd S. Leavell, M.D., and Oscar A. Thorup, M.D. Philadelphia, Saunders, 1960. 503 p. Price: $10.00.

American College of Hospital Administrators. Directory, 1960.

A Doctor in Many Lands; an Autobiography: By Aldo Castellani. Garden City, Doubleday and Co., 1960. Price: $4.95.

Nine Months' Reading: By Robert E. Hall, M.D. Garden City, Doubleday, 1960. 191 p. Price: $2.95

Thoracic Surgery Before the 20th Century: By Lew A. Hochberg, M.D. New York, Vantage Press, 1960. 858 p. Price: $15.00.

Merck Index: Merck, Rahway, N. J., 7th edition. 1641 p. Price: $12.00.

Book reviews

Basic Office Dermatology: By Stuart Maddin, M.D., Julius L. Danto, M.D., and William D. Stewart, M.D. Springfield, Charles C. Thomas, 1960. 308 p. Price: $11.75.

The purpose of this book is to make the general practitioner more knowledgeable in the diagnosis and management of the common skin diseases. Each dermatosis is succinctly discussed under the captions—significant facts, clinical appearance and course, histopathology, differential diagnosis, diagnostic aids, office management, and suggested reading. Well-selected photographs and diagrams of the usual distribution of each disease are also provided.

The treatments recommended are practical,

current and sound. The authors emphasize that: "It is a rule rather than the exception for patients suspected of having a drug eruption to omit, deny or forget having used a common drug which could be causative."

This guide is well written and organized. It is the best of the dermatological manuals for desk use for the practicing physician, who requires a ready reference book.

Egbert J. Henschel, M.D.

Physical Diagnosis: By John A. Prior, M.D., Jack S. Silberstein, M.D., and contributors. St. Louis, C. V. Mosby Co., 1959. 388 p. Price: $7.50.

This textbook is written by ten clinical professors at Ohio State University College of Medicine, each one dealing with his specialty. It is intended for the freshman or sophomore medical student beginning physical diagnosis.

To teach one who knows little about the natural history of disease, how to elicit a good medical history is difficult, but at least a good starting point is made for the student in the second chapter of this book. This is the best discussion of this difficult topic I have seen. Included are definitions of many terms, saving the aspiring student many trips to the dictionary.

The other chapters do not differ from other physical diagnosis books in content but are worthwhile because of their simplicity and clarity. Eponyms, rare diagnostic procedures and the legion pioneers of medicine are omitted from this book, eliminating many of the stumbling blocks not for the moment germane to the issue. The illustrations, however, are not up to the quality of the written material, being for the most part uninformative sketches or normal individuals posing for demonstrations of different diagnostic procedures, some of which border on the insane.

Should the student buy this book? Expenditures for most medical students are of necessity limited and, in my opinion, worthwhile if the book in question is to be used as a reference, a criterion which this book does not fulfill as well as the longer, more encyclopedic Adams! Each student should read this book, however, a much simpler task than wrestling with the antiquated, stilted standards, such as Leopold or Major, for the same essential information.

John H. Clifford, Junior Medical Student,
University of Colorado School of Medicine

"Psst—Candy Bars?"

National Foundation fellowships

The National Foundation has announced availability of several postdoctoral fellowships for candidates who are preparing for careers in scientific research and/or academic medicine.

Financial benefits for the fellowships are generally a basic stipend of $4,500 a year with $540 a year for each dependent and an annual increase, ordinarily, of $480. Under unusual circumstances, higher stipends may be permitted. Fellows may not accept supplementation to their stipends nor engage in employment for which they receive compensation.

In addition to research fellowships, clinical fellowships are available for clinical study in arthritis and related diseases; for advanced study in orthopedics; for study and research in the teaching of preventive medicine; for study in rehabilitation.

Research and teaching fellowships are also available in the fields of orthopedics, pediatrics and neurology.

Further information may be obtained by writing: The National Foundation, 800 Second Avenue, New York 17, N. Y.

Traffic safety

Nearly 1,000,000 American men, women and children were injured or killed last year because an automobile driver exceeded the speed limit.

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	Excellent	Good	Fair	Poor	Total
LOW BACK SYNDROMES					
Acute low back strain	25	19	8	6	58
Chronic low back strain	11	5	1	1	18
"Porters' syndrome"*	21	5	1	1	28
Pelvic fractures	2	1	—	—	3
NECK SYNDROMES					
Whiplash injuries	12	6	2	1	21
Torticollis, chronic	6	2	3	2	13
OTHER MUSCLE SPASM					
Spasm related to trauma	15	6	1	—	22
Rheumatoid arthritis	—	18	2	1	21
Bursitis	2	6	1	—	9
TENSION STATES	18	2	4	3	27
TOTALS	112 (51%)	70 (32%)	23 (10%)	15 (7%)	220 (100%)

*Over-reaching in lifting heavy bags resulting in sprain of upper, middle, and lower back muscles.

Dosage: **Adults, 200 or 100 mg. orally three or four times daily.**
Relief of symptoms occurs in from fifteen to thirty minutes and lasts from four to six hours.

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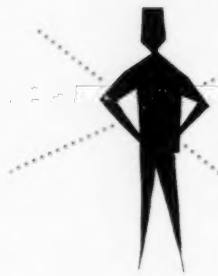

Reminders in **THERAPEUTICS**

Congenital dislocation of the hip

Diagnostic signs and treatment

Frederic W. Ilfeld, M.D., Beverly Hills, California

When there is limitation of abduction of the thigh, as tested in flexion, congenital dislocation of the hip should be suspected (Fig. 1). This sign permits an early diagnosis in the newborn or infant. Every baby should be tested, not only on the first examination but on succeeding visits. To constantly think of congenital hip disease will lead to its early recognition.

Early diagnosis of congenital dislocation of the hip is imperative, since early treatment usually leads to a cure.[1] When treatment is started under one year of age, a good result may be expected in 80-90 per cent of cases. When treatment is started under two years of age, 60 per cent attain good results; under three years of age, 33 per cent; and over three years, only 25 per cent.

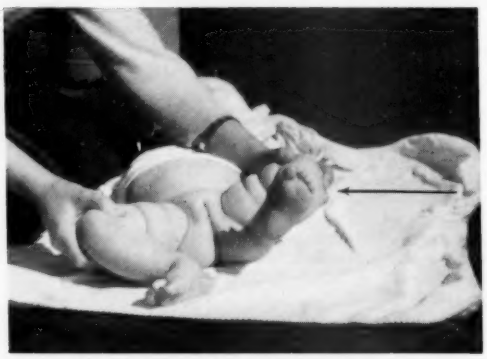

Fig. 1. Limitation of abduction of the hip is a diagnostic sign of congenital hip dysplasia.

In addition to limitation of hip abduction, other physical signs of hip diseases are (1) unequal leg length, (2) prominence of one trochanter, (3) "Ortolani's" click of entrance and exit of the femoral head into the acetabulum, (4) instability of the hip on "push and pull" tests and (5) a positive Trendelenberg Test. Inequality of thigh, gluteal or inguinal folds is found in about a third of normal patients. This is only a suspicious sign.

X-rays may show (1) disruption of "Shenton's Line," (2) an increase in the acetabular angle, or (3) displacement of the femoral head laterally and superiorly. The x-ray is a laboratory test. This is especially true in the young infant. Their bones are so cartilaginous that the radiograph may give a false impression. Clinical findings are, therefore, more reliable. Of these, limitation of abduction of the hip is the most dependable early diagnostic sign of congenital hip disease.

Treatment of dysplasia is directed mainly at the limitation of hip abduction. In fact, it has been suggested that dysplasia of the hip is a spasm of the femoral adductor muscles and should be called "Femoris Adductis." The most simple treatment is to stretch the adductor muscles by frequent, parental, manual exercises. If this is unsuccessful, the wearing of an abduction splint (Fig. 2) at night, for two-four months, will give a good result in all cases.[2]

Dislocation of the hip under one year of age may be treated with a simple abduction splint (Fig. 2). The splint consists of two metallic thigh cuffs, with washable covers, joined to an adjust-

A feature, courtesy of the New Mexico Medical Society, compiled by Editor Aaron Edwin Margulis.

able bar by universal joints. The cuffs are adjusted with an Allen wrench. To enable the patient to sit or lie down, the thigh cuffs are connected by a right angle joint to allow motion through 90 degrees. This permits easy sitting or lying. Shoulder straps or a pelvic band may be used to hold the splint in place. The splint is easily adjusted for abduction and growth, controls rotation of the hip, and has no pelvic band. This splint provides treatment without anesthesia, hospitalization or plaster cast. The splint is usually worn full time for three-four months. During this period, it is taken off twice a day for bathing and hip rotation-abduction exercises. It is then worn as a night splint for an additional two-four months or until x-rays show satisfactory bony development.

The splint permits the dislocation of the hip to be reduced by gradual abduction of the thighs, without force. As the thighs are slowly abducted by manual exercise, successive adjustments of the splint and the natural kicking of the patient, the hips assume the frog leg position of abduction and external rotation. This allows the femoral head to be directed into the acetabulum. The motion of the hip and the pull of the hip and thigh muscles exert pressure against the interposing soft tissue and the acetabulum. In this way, the hip joint is stimulated to develop in a more normal manner.

Over one year of age, to about three years of age, treatment usually consists of abduction traction in the hospital for 7-14 days, adductor tenotomy, reduction of the hip under anesthesia and immobilization in the abduction splint. After three weeks, the splint is removed twice a day for bathing and abduction rotation exercises. Occasionally, a plaster hip spica cast may be indicated for immediate postoperative immobilization. In this way, prolonged imprisonment in a plaster cast is eliminated (Fig. 3).

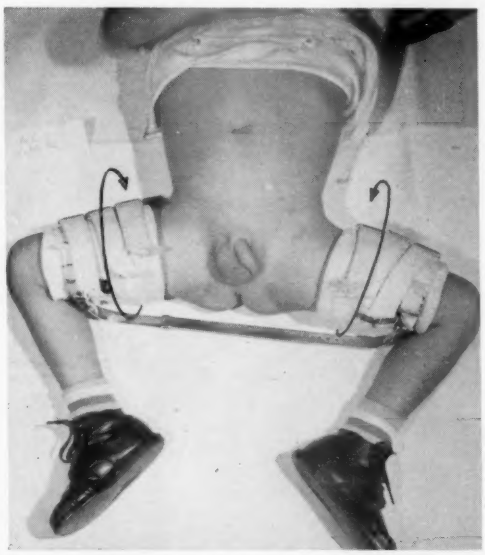

Fig. 2. Abduction splint holds legs in "frog-leg position. Fulcrum of pull of hip muscles is directed toward acetabulum.

Fig. 3. Walking in splint.

When these closed methods fail, open or surgical reduction of the hip may be necessary. In 44 cases[3] no harm was found in first treating the patient by conservative methods. The best results of open reduction occur when the surgery is done in the 2nd, 3rd or 4th years of life. The worst results occur under one year and after the 5th year of life. In about 65 per cent of cases a good result is obtained. When open reduction fails, a Colonna Reconstruction Operation may be necessary.

Summary

Early diagnosis of congenital dislocation of the hip leads to easy treatment and good results. Complicated treatment and poor results come from late diagnosis. Limitation of hip abduction is an early positive sign of congenital dislocation of the hip.

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[2]Ilfeld, F. W.: The management of congenital dislocation and dysplasia of the hip by means of a special splint. J. Bone and Joint Surg., 39-A: 99 (Jan.), 1957.

[3]Roche, J., and Ilfeld, F. W.: Congenital dislocation of the hip, a study of open reduction. Calif. Med., 89:127 (August), 1958.

WHEN ULCEROGENIC FACTORS KEEP ON WORKING...

Health insurance benefits double in five years

American families received about $3.1 billion in benefits under voluntary health insurance during a 12-month period in 1957-58, Health Information Foundation reported recently—more than double the amount for a similar period five years earlier.

In its monthly statistical bulletin, Progress in Health Services, the foundation published the third in a series of preliminary reports on a study made in cooperation with the National Opinion Research Center of the University of Chicago. A representative cross-section of American families were interviewed at length about what kinds of medical services they use and how they pay for these services.

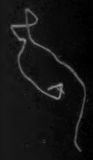
The average insured family in 1957-58 had $80 in benefits from voluntary health plans, the foundation revealed. This is an increase of 78 per cent over the $45 reported in a comparable survey for 1952-53.

Insurance benefits now pay for 24 per cent of the average insured family's total bill for hospital, medical, dental, and other health services. Five years earlier the figure was only 19 per cent.

One of the most significant findings of the survey is that families with unusually heavy costs for health care have been helped the most by recent increases in insurance benefits.

For example, families with health costs of $1,000 and over averaged $572 in benefits for 1957-58 against only $362 in 1952-53. Families spending between $750 and $1,000 in 1957-58 received $257 in benefits, while comparable families in 1952-53 received only $204.

Among families with annual expenses of $500 or more in 1957-58, only 24 per cent have 50 per cent or more of their total bill reimbursed by insurance. Benefits paid these high-cost families can be increased, as can the proportion of families who receive this protection against high costs, provided the public is willing to bear the cost of increased protection.



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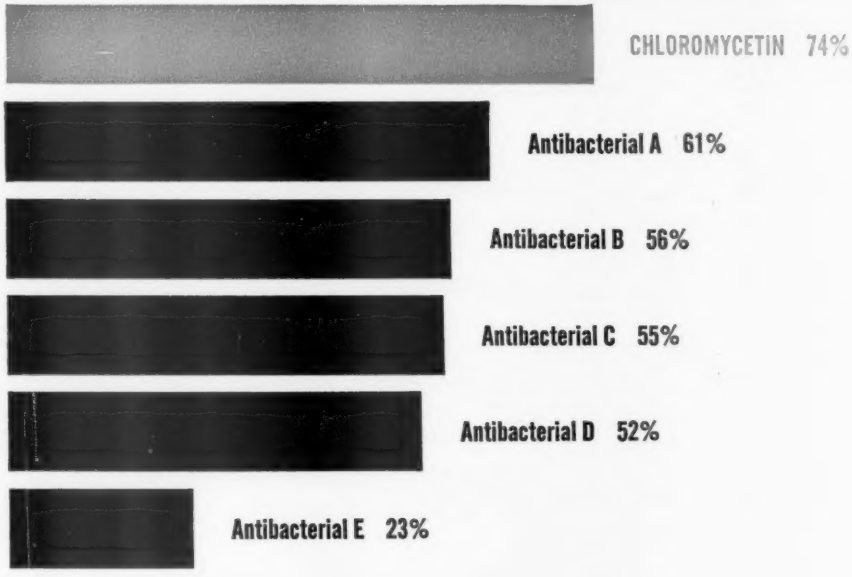

*Adapted from Goodier & Parry[1]